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World famous Manufacturers of Sheep Dips, Worm Drenches and other Stock Remedies.

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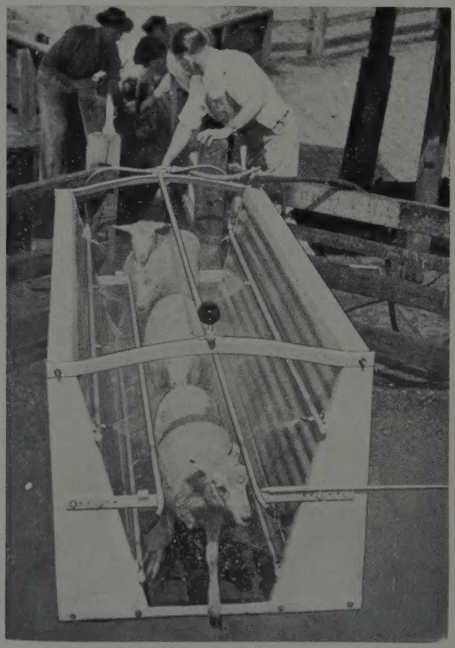

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(Established 1910)

NEW ZEALAND JOURNAL OF Agriculture

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Minister of Agriculture

This Month's Cover

The helicopter, recently introduced for agricultural work in New Zealand, has already done enough to indicate its potentialities, particularly for weed control, in much of the difficult hill country. It is especially suited to spot applications and aerial spraying of crops and hill pastures. However, there are difficulties which will have to be solved before the helicopter will reach its full capabilities. An obvious advantage, shown on the cover illustration, is its capacity to operate from a small, cleared area in rough country, whereas fixed-wing aircraft require an airstrip. Photograph by National Publicity Studios.

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TABLE OF CONTENTS

Handling Crossbred Wool at Shearing	R. G. Montgomery	322
Feeding and Management of Household Poultry in Laying Cages	P. Josland	335
Dairy Produce Graded for Export		336
Crops for Facial Eczema Control	H. McM. Bull	341
Care of Livestock during November		346
Crop and Pasture Management (Seasonal Notes)		347
Free Range Management of Growing Poultry Stock	F. C. Bobby	349
Prevention of Disease in Domestic Bees	A. W. Bennett	353
Meteorological Records for August		356
Sheep-carrying Capacity Trial at Winchmore Irrigation Research Station	G. K. McPherson	357
Distribution of Dairy Cows in Milk in New Zealand		360
The Home Garden	A. G. Kennelly	363
Sheep Dusting—Safety Precautions	P. L. Thomas	375
A Method of Joining Mole Drains to Existing Tile Lines	A. A. Duncan	376
Recent Research Work: Variety Trials with Cereals	K. Cottier	377
Soil Conservation on North Island Hill Country	A. N. Glass	378
Citrus Varieties and Rootstocks for New Zealand	W. A. Fletcher	393
Show Dates and Wool Sale Dates		400
Classification of Factory Supply Dairies	M. H. Wallace	401
Tilting Stand for Honey Tank	D. Roberts	403
Radio Broadcasts for Farmers		404
The Flower Garden	K. H. Marcussen and Rosalie A. Campion	405
Choosing Carpets and Other Floor Coverings	Christine Lyons	416
Household Uses for Silicones	Eleanor Couston	422
A Dainty Lace Stole for Evening Wear		424

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Handling Crossbred Wool at Shearing

By R. G. MONTGOMERY,
Sheep and Wool Instructor, Department of Agriculture, Hastings

BECAUSE of the high value of wool and the problems of obtaining sufficient skilled labour in woolsheds at shearing every wool grower should understand the fundamentals of preparing his wool clip and be able to instruct his staff how the various lots of wool should be prepared. Irrespective of where the wool is classed, a good clip must be efficiently skirted and odd lots correctly separated in the woolshed at shearing time if the best possible price is to be secured for it.

A GROWER must accept responsibility for the standard of his shed work and to do that he should be in his shed throughout shearing. Rough or inefficient shed work, faulty skirting of good wool, and the mixing of oddments cannot be corrected fully after the wool has been rolled and pressed, even by expert staff employed by selling agents. Unfortunately the oddments (necks, pieces, bellies, etc.), which on good wool normally constitute about one-third of the wool clip and therefore a considerable portion of the wool cheque, are often considered just oddments and fail to receive adequate attention.

Many growers of good-type wool have neither the time nor the opportunity to make a detailed study of the trade grades, specialty lines, and workmanship required to obtain the maximum return, but the selling agent will attend to these matters efficiently in his bin or reclass if the wool has been correctly treated in the shearing shed. Fleece wools generally receive more attention in the shed than do the oddments, but it is from the latter particularly that many growers can secure better returns.

Woolshed Design

Woolshed design and wool handling are complementary. A woolshed should be designed to facilitate speedy and convenient sheep movement, assist shearers to handle sheep efficiently while removing fleeces in the shortest possible time, and permit quick, marketable presentation of all wool.

Layout

Good shed work depends much on the layout of the woolshed. Too often a shed is designed to suit sheep work, shearers, or wool handling and not as a unit to suit a combination of all three. If there is any secret in attaining good all-round workmanship, it is in a well-designed shed, with efficient organisation and harmonious team work. A gang working as individuals seldom produces satisfactory results.

Shed Work

Many farmers believe that shed work is not important when a clip is forwarded for reclassing or binning, a misconception that is responsible for considerable loss of revenue, irrespective of unnecessary labour charges.

Heading photograph by R. W. Orr.

which directly or indirectly must eventually be borne by the grower. When a clip is baled and pressed in the grower's shed it bears the hallmark of that shed's workmanship. Rough work, faulty skirting of good fleeces, and mixing of oddments cannot be compensated for by later expert attention in reclass or bin. Time and labour are too valuable to waste in attempting unchargeable reskirting or hand picking of oddments, work which would have been comparatively simple in the shearing shed and could have been done more efficiently there. Expert staff cannot successfully unblend a mix that should never have been made.

Wools do not all require the same amount or standard of handling. The better the style and type of wool are the more important is the handling. Conversely, some wools from more difficult country—wools tending to inferior style—may not warrant first-class handling. The farmer's problem is usually that of knowing where special workmanship pays and where it does not, which emphasises that the most profitable field instruction on shearing and shed work is that given to the farmer or his son or manager.

Shearers and shed hands normally do their best when working under a farmer who knows what he wants and can show how it should be done. Even good shearers and shed hands tend to skimp their work when they realise that the man in charge is unable either to supervise or appreciate good workmanship.

Mustering

For the purpose of this article preparation of the clip will be considered from the muster before shearing. The shearing muster should be made over the cleanest routes, contamination from sources such as road droving, dirty country, seed, heavy thistle, burns, or blowing sand being avoided where possible.

Dust Discoloration

Often farmers inspect their wool in their own sheds only; they do not compare it with other lines and are often unaware of the full detrimental effect of dust, because usually the whole clip is similarly affected.

The harmful nature of burrs, seed and other vegetable matter, sand, thistles, and so on is often recognised, but the extent to which dust can affect appearance, yield, and grading is not so well appreciated. Research on one good clip showed a 12 per cent. reduction of the total wool cheque through dust, which alone caused the wool to be put into a lower grade. In this case new sheep yards on a less dusty site to obviate droving on a metal road would have been very profitable.

The harmful effect of dust associated with mustering, road droving, and yarding is seldom fully appreciated by wool growers. Many farmers who consider their wool to be of good colour would be astounded if they could compare their clip with a really bright line. All farmers should take the opportunity extended by agents to view their wool clip when shown for sale in the wool stores. There they will be able to compare the colour and style of their clips with a much wider range than they may be familiar with locally.

Clean Sheep

Clean sheep yards are important. Where dust is inclined to be troublesome a hose or a sprinkler system can be used. All loose rubbish, free dirt, leaves, and sheep droppings should be cleared away before the yard is dampened. Crushed wet droppings or crushed dry droppings and a good breeze will soon discolour a whole yard of sheep.

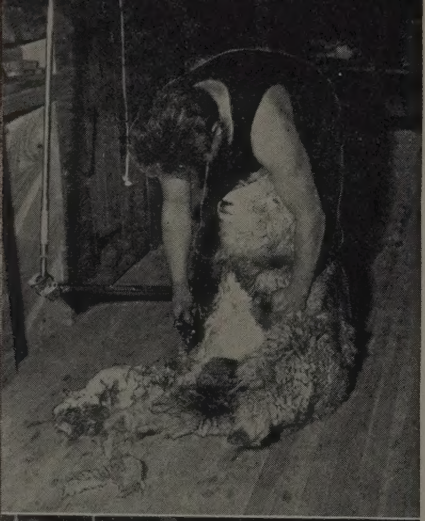
A farmer who puts clean sheep in a dirty shed cannot expect shearers and

Sheep Dusting NOT Authorised Alternative to Dipping

Dusting is not a method approved by the Stock Act for the control of lice and keds and is not legally an alternative to normal dipping.

Farmers who may have been misled by publicity for the dusting method and advertisements for dusting preparations should realise that they are still obliged to dip sheep as prescribed in the Stock Act. Any alteration in farmers' liability to dip can be made only by amendment of the Act, and until they are advised authoritatively otherwise, they should plan to dip in the manner prescribed by the Act.

▼ Clean sheep are essential to clean workmanship at shearing time. Sparrow photo.



CORRECT SHEARING

Upper—When opening up, the shearer should remove all the belly wool.

Middle—The belly is cleared and the shearer throws the full belly out to the fleeco.

Lower—Breaking the neck to allow clean picking up and correct throwing on to the wool table.

shed hands to produce good, bright wool. Dirty pens lead to a dirty shearing board, and a dirty shearing board to a dirty or dull clip. Dirty conditions are usually synonymous with dirty, slovenly workmanship.

Dagging

Dagging must be thorough if clean, bright wool is to pass over the wool table. Odd daggy sheep create dirty conditions that affect all wools handled and they add to costs by forcing the employment of additional labour to handle the dags, which always tend to produce dirty working conditions.

With large flocks the sheep to be dagged can be drafted off and the dagging done efficiently on the shearing board before shearing in a manner similar to fly crutching. An advantage of this method is that it can be done under clean conditions and there is no waste.

With smaller flocks odd dirty sheep can be dagged in a clean pen or yard, but cleanliness is essential for clean, bright fleece wool. Where a few sheep require dagging before entering the shed some farmers may prefer to dag them standing and so avoid sitting full-woolled sheep in dust or dirt.

To assist in the dagging of standing sheep an arrangement of light rope loops can be used. These loops are fitted at intervals along the sides of the crush pen. Two holes are bored, one above the other, in the side of the crush and a light rope knotted at one end passed through the bottom hole, up the inside of the crush wall, and out through the top hole, where it is passed through a loose wooden block (or other slightly weighted object) and again knotted. The loose wooden block holds the rope taut against the side of the crush when the rope is not in use, but when a sheep is to be dagged the loop is pulled out and the animal's head pushed through. A sheep held against the side of the crush and pushed forward into the rope collar can be dagged quickly and efficiently while standing. This method saves considerable exertion and saves turning big sheep over. At no time is the wool in contact with dirty or dusty flooring or yard.

After dagging, sheep should not be penned too tightly in the woolshed; catching pens should not be filled overnight, as it is almost impossible to keep a shearing board clean if catching pens become fouled. Staining from dirty catching pens often makes heavy skirting necessary.

Drafting

Ewes, rams, wethers, hoggets shorn as lambs, long-woolled hoggets, and lambs should all be drafted and shorn separately. Pieces, bellies, and necks from hoggets are usually much finer than similar wool from older sheep and warrant separation.

A few wethers shorn with ewes can depreciate a whole bale or line of bellies unless the urine stains have been removed from the wether bellies and that is seldom done where sexes are shorn mixed. If mixed sexes and ages go over the board together, more facilities and much more space are required than the average wool room can provide.

Apart from this, it is almost impossible at this busy time for even an experienced classer to give mixed lots the attention they warrant. Black or pigmented sheep should be drafted off and shorn separately or at least left to the end of a shearing run to give the shed hands time to keep the coloured wool separate.

Cleanliness in Woolshed

The need for cleanliness in the woolshed cannot be over-emphasised. Clean, bright conditions generally lead to better workmanship and a much greater interest in the work. The woolshed floor should be scrupulously clean before and during shearing and the board and wool table should be scrubbed well. In some districts it is customary for the board and table to be scrubbed after shearing, but though this is a good practice, scrubbing before shearing is more important.

To dislodge accumulated dust all the machines in the shearing shed should be started before the final pre-shearing clean-up and before shearing.

Shearing

Shearing can be defined as "removing the fleece in the most marketable manner while leaving the sheep in the best condition to grow another good fleece". With ewes the ability to produce and feed their lambs must also be taken into account.

Pick-up and Throw

Assuming that shed hands in a 4-stand shed must completely handle a fleece each 40 seconds of the 9-hour day, the way a fleece is picked up, thrown on to the table, and skirted obviously plays the major part in good wool handling. Where fleecos are allowed to throw fleeces on to the table in a heap too much time is used in trying to set the fleece in position for skirting, skirters become exasperated or just indifferent, and poor workmanship is the result. These circumstances help to explain why heavy-conditioned skirtings often show up and depreciate lines of good fleece in the wool sale show stacks.

The way in which a shearer leaves a fleece on the shearing board has an important effect on picking up and throwing on to the wool table. A

fleece that the shearer has had his foot through or one left out of position is awkward to pick up and usually ends in a heap when thrown on to the wool table. To counteract these shearing faults it is recommended that all learner shearers pick-up and throw their fleeces during instruction.

When a shearer leaves a fleece in a bad position, particularly where this is aggravated by the bad shearing habit of looping the neck fold over the sheep's head, he holds up clearing of the shearing board, picking-up, and skirting, and eventually causes "woolling up" of the wool room.

When the shearer breaks the neck fold open and leaves the fleece in a good position where it can be picked up correctly and then thrown to spread evenly over the wool table proper skirting can be done in about a third of the time needed to deal with a badly handled fleece.

A fleeco must be able to grip the two hind legs of a fleece on the shearing board, gather the fleece together, and throw it above and well forward over the wool table to allow it to settle evenly over the table like a spread blanket. Where that is done skirting can be quick and efficient. Where a fleece has a looped neck the unbroken neck loop usually catches on the table, folds under, and causes the fleece to land in a heap. Undoing this tangle wastes time and hampers efficient working.

Skirting

There are many rules for skirting, but some of them when applied to the wrong types of wool give indifferent results. Skirting rules must be applied with common sense. A good all-purpose rule is to take off as little as possible to leave a clean, uniform fleece.

Experienced table hands know what and where to skirt and what to do with the pieces, but where "green" hands are employed it is safer to instruct them to leave odd heavy, burry, dirty, black, or cotted fleeces unskirted and to place them in a separate lot for the broker to handle. Such fleeces if skirted may affect seriously good piece lines, as the dirty or cotted points usually find their way into the better piece bins.

Some farmers do not appreciate the value of good skirting. A point often overlooked is that though low-grade, off-colour wools may not warrant more than limited handling, the importance of skirting increases proportionately with better-type wools. If wool prices fall, the difference between skirted and unskirted lines will be much more apparent. Poorly skirted or unskirted lots of good wool will be the first to feel the repercussions of a buyers' market.

First Pieces

First pieces need not be big pieces and should not be confused with "broken fleece". Heavy-handed skirters must be checked, because as much good clean wool as possible should be left on the fleece, provided it is of the same general style. On the other hand, many shed hands fail to look for the heavy-conditioned fringe behind each foreleg, particularly when they fold under the fleece. A common form of bad skirting is the removal of big pieces from some parts of the fleece while leaving small, heavy-conditioned pieces and stains on other parts.

First pieces come from all parts of the fleece. Some skirters believe that skirtings from the shoulder are firsts and britch-end skirtings are seconds. That is not correct. First pieces can have a fairly wide quality range.

Skirting long, rope-like strips should never be permitted, as that form of skirting removes good wool that should have remained on the fleece.

In a large shed, particularly in a wet shearing season, a problem sometimes arises where off-coloured or pen-soiled pieces would spoil the main line of first pieces. Where that happens the first pieces can be made into two lots, the bright line being marked as "1st pieces" and the pen-soiled lot as "Pieces". Provided the soiled pieces are quite dry before pressing, they usually open up for sale in quite good condition, a little inferior in colour to the bright line but too bulky for second pieces.

Wool Table

A wool table that is too small is frequently another cause of faulty skirting and big pieces. A good wool table should be accessible from all sides, between 8ft. 6in. and 9ft. long, and 4ft. 6in. wide. On smaller tables large fleeces will overlap and, if the wool tends to be open, big sections may fall off or come off in the skirter's hands, though he or she intended only to trim.

Necks

Removal of neck wool should receive much more consideration than is usual. The neck is a collar piece and it is this fold alone that should go into the neck bin. The average neck should weigh about 1½oz., not as is common about 1½lb.

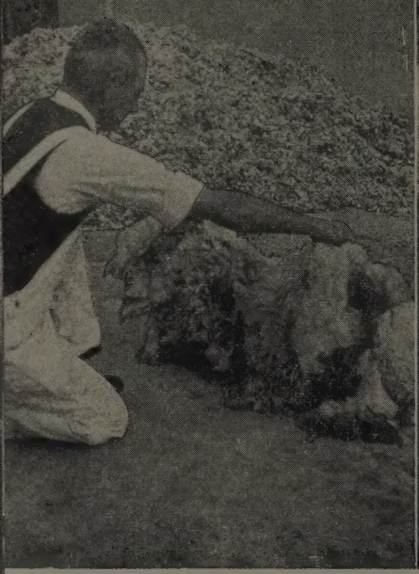
Shoulder wool is usually the best part of the fleece and should not be removed. Taking off shoulder wool with the neck merely depreciates the fleece; it is one of the most common faults of heavy-handed or careless skirters, and growers should give this point particular attention.

Necks that are comparatively free of seed, burr, or vegetable matter should be kept separate. Hogget necks are usually finer than neck wool from older sheep and should always be separated, even if it means sending a small lot to the broker's bin.

Second Pieces

Second pieces are usually small. They are shaken from the pieces from

Team work: Fleeco about to pick up fleece as a good fast shearer finishes the last leg.



Picking-up Lifting shoulder end of fleece to tuck under the neck wool.

The neck being tucked under by another method, the fleece using his feet for the job as he seeks the first hind leg, which is often tucked under.

The first hind leg secured.

the regular clearing of the shearing board and wool room floor. They are not good enough for first pieces, but too good for locks. When the floor is being cleared up any pieces good enough should be placed in the firsts, the balance being shaken over to make seconds and locks.

Locks

Locks should be the small, locky pieces left after second pieces have been shaken out. They should not be depreciated by dirt, string, or matches. Too often so-called locks are a mixture of locks and second pieces and sold as "Lox". Locks should not contain dags.

Fleece Brands

Where a flock carries a year-old brand of approved wool-marking fluid it is normally well diffused by shearing time and these old brands are usually ignored when general throughout a complete line. Where there are fairly new or old heavy brands they should be removed and the wool set aside as "Brands". Scourable branding fluids have enhanced the value of these brand pieces and today they sell well.

Most farmers are aware that wool-branding materials must be tested and approved by the Department of Agriculture before they can be marketed. It is an offence to use other than approved wool-marking preparations or to add anything to an approved preparation which will make it harmful to the wool. Brands should always be as small as practicable.

This legislation is in the wool growers' own interests, because brands which will not scour out cause enormous damage and loss in the woollen mills; eventually this loss has to be borne by wool growers.

Rolling

The best form of rolling is that which can be done speedily and efficiently on the wool table to give a roll which will hold the fleece together and which can be easily rehandled. However, it does not always pay to insist on changing accepted practice. The much-used roll whereby the sides are turned in and the fleece is rolled from both ends to make a double roll has the advantage that many shed hands are accustomed to it and can do it quickly. Its principal disadvantages are that it presents the back wool and that it is easy for a presser forcing wool into a pack to put a foot on each side of the roll and break a fleece.

When a fleece is folded in from both sides and then rolled from both ends the bulk of the wool showing is back wool, which is not a fair sample of the average fleece and often is the weakest part. With rolling from both ends it is easy to exaggerate even a minor weakness and mar general appearance, particularly when table hands apply tension to produce tight, compact rolls.

Shoulder Roll

The type of roll will not influence a wool buyer, but the shoulder roll usually presents a fair sample of the fleece. An important advantage of the shoulder roll is that the fleece goes to the press in one roll (not in two rolls folded together), it is not easily split into two pieces, and there is less likelihood of fleeces being broken.

Average and good table hands after receiving instruction have proved that the shoulder roll is as quick and efficient as any other roll, that it gives a good general appearance, and that it holds fleeces together for pressing and later trade handling.

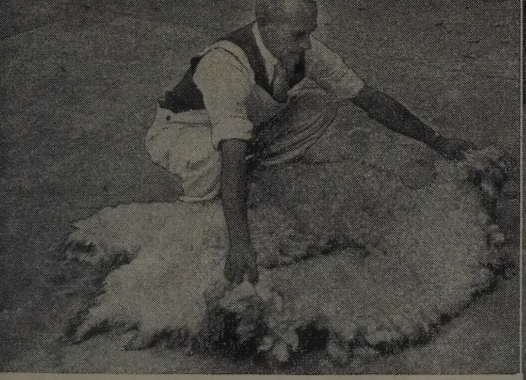
In the shoulder roll one side of the fleece is turned in about one-third and this double fold turned over again on to the remaining third. The fleece is then rolled from the britch to the shoulder. Just before the roll is completed the end of the shoulder wool, where the neck fold has been removed, should be folded in. The short fold-in of the skirted shoulder assists the reopening of the fleece for later trade handling.

Separation of Oddments

To secure correct grading of the oddments the necessary facilities must be provided. Convenient receptacles are essential for a thorough job, but provision of them is not always simple. Packs set in cumbersome frames, some hanging half closed against the wall or others held open by wires suspended menacingly from the rafters, are often the only equipment. If convenient means for disposing of the various lots are provided, the job will usually be done, whereas with cumbersome fittings workmanship tends to be skimped.

The sorting of oddments such as lambs' wool and crutchings can be overdone. It does not always pay to try to make "Super" lines by overpicking the firsts and thereby making a line of seconds that are really firsts and seconds mixed.

For example, where 4 bales or 1200lb. of well-picked, good lambs' wool may return 58d. a pound, oversorting could give a small line (say 200lb.) of



The fleece about to pick up the fleece. The neck is tucked under and the fleece has a firm grip on either hind leg. It is important that this grip should be held throughout the throwing of the fleece.

Folding the fleece before pick-up.

Second stage of folding the fleece.

"Super" at 66d. and 1000lb. at 54d. That illustrates the danger of overlooking the advantage of good bulk lines, because, disregarding the labour and charges involved at a busy time, the extra work did not pay, even though it may have given a good appearance to the wool:—

1200lb. @ 58d. .. .. .. = £290
200lb. @ 66d. + 1000lb. @ 54d. = £280

Stained Pieces

The provision of a pack or bin to take stained pieces is important. If the bin is conveniently placed, the board and table hands will usually dispose of all stains promptly and efficiently. Where facilities for dealing with stained pieces are inadequate they are often allowed to pass, marring other lines.

Stained pieces are often damp and if pressed attached to bellies or with clean locks, pieces, or crutchings, contaminate much good wool. Any wool marked by phenothiazine or bluestone should always be separated and sent to the agent's bin.

Bellies

Shearers must remove **all** the belly wool and toss the complete belly aside. Where a shearer takes off a narrow belly, a belly fringe is left on the fleece. Invariably this fringe gets into the pieces bin and depreciates otherwise good pieces. Shearers who do not throw the belly clear endanger shed hands and they should be reprimanded at once.

Bellies often receive less attention than they warrant. In many woolsheds they are disposed of directly from the shearing board, light, heavy-condition, free, and light- or heavy-seed types being mixed and carrying brisket-point and urine stains.

Stains should be removed from good bellies, especially urine stains. This should be noted by the small farmer who carries a few wethers and shears them with his ewes, as many bales of bulk ewe bellies are depreciated a grade because a few wether bellies from which urine stains have not been removed have been included.

Where the bellies are free from burr and of good style the stained brisket points should be removed and made into a separate line which, being light in condition will meet a ready market at good prices. The unstained, good bellies if separated will be up-graded. Poor style, badly coloured, or seedy bellies do not warrant special attention.

Southdown Bellies and Pieces

On some fat-lamb farms where a few Southdown rams are shorn the pieces and bellies are folded up in the fleeces, which are then sent to the selling agent. Enclosing bellies and pieces in rolled fleeces is not a good practice and causes needless waste of time and labour.

Most agents have a bin for Southdown bellies and pieces and much time would be saved if these oddments were separated in farm woolsheds. Because a few farmers fold Southdown bellies and pieces up in fleeces, all Southdown fleeces are often opened to see if they contain oddments. Southdown fleeces are very difficult to unroll after pressing and many good fleeces are broken when they are being checked to see whether bellies and pieces have been rolled in.

Eye Clippings

Eye clippings from woolly headed sheep, also referred to as face pieces, wiggings, or topknots, should not be mixed with good crutchings, pieces, or lambs' wool. These face pieces are usually fine, fluffy, kempy, and light conditioned and are particularly undesirable mixed with good lambs' wool, pieces, or crutchings.

Good staff on the board will seldom let face pieces reach the wool table,

The fleece correctly picked up and ready to throw on the wool table.

as they generally fall loose on to the board at shearing. Most good shearers when requested will sweep the head wool aside as it is shorn. These face pieces should be kept separate and later sent to the selling agent, who makes provision for these and other small lots of oddments.

Leggings

On the question of leggings, or leg pads from below the hocks, there is often more discussion than is warranted. With some breeds and crossbreds the question does not arise, as they have no leg pads. Where sheep have so-called wool down the legs, the question is often asked as to whether shearers should take the leg pads off or leave them on the sheep. The answer is that it has nothing to do with the shearer. Unless the

I'm Sticking to the DRENCH backed by years of veterinary research!

Elliotts, the pioneers of liquid phenothiazine drenching have, by constant research and improvement, kept Phenzeen Plus in a pre-eminent position.

Proof is to be found in the number of successful sheepfarmers who would use nothing else. Their motto is "When you find a good thing stick to it."

The drench that pioneered Liquid Phenothiazine

MAXIMUM WORM KILL AND EASY, FREE FLOWING LIQUID SUSPENSION

Elliotts PHENZEEN PLUS

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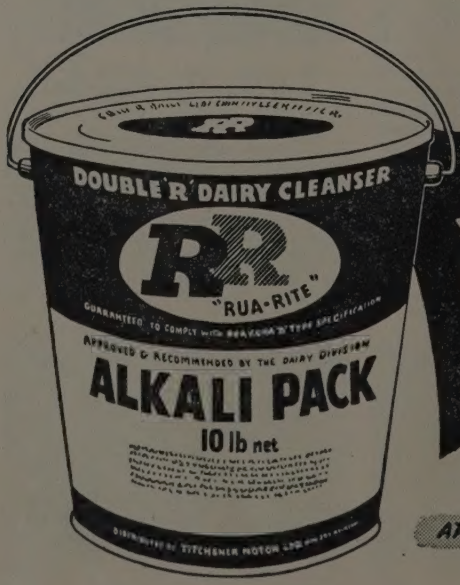
8 out of 10

N Z. FARMERS USE



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APPROVED & RECOMMENDED BY THE DAIRY DIVISION

Guaranteed to comply with Ruakura "B" Type Specification.

shearer has special instructions from the owner of the sheep he should shear the whole sheep thoroughly.

Sometimes an owner will want leg pads left on the sheep because of the important sorting necessary for particular types of wool such as good lambs' wool. Farmers who have this leg-pad problem may find it preferable to remove the leggings at the last fly crutching before the main shearing.

From a wool handling point of view alone it may be considered that leg pads should be left on the sheep, where they do the least harm, but there are other factors, such as sale appearance or perhaps with sheep from burry or seedy country moisture in behind the seed-matted leg pads which could encourage fly strike.

The question of leg pads being left or taken off is one that must be settled by the owner of the sheep. If he gives no specific instructions, shearers should shear the sheep completely and shed hands should separate the hairy leg pads and send them into the agent's bin to prevent them being mixed with and depreciating other good oddments.

Lambs' Wool

Good length, well-picked lines of lambs' wool normally sell at high prices. A length of 3in. is an important standard in many types of wool and lambs' wool shorter than this should always be separated from wool longer than 3in.

Where black-faced and white-faced lambs are shorn on the same property they should always be kept separate.

Lambs' wool can normally be divided into two main classes: The shorter, early shorn lots and the better length, later-shorn lots. Where arrangements for shearing and other management allow, shearing of lambs when their wool is just under 3in. long should be avoided. If the farmer can give them a few more weeks in the paddock, he will get that valuable premium for good lambs' wool over 3in. long.

The sorting of good lambs' wool has paid handsomely in recent seasons and there is every reason to believe that it will continue to do so. Good lambs' wool should be sorted on the board, the longest, brightest, and best being made into the top line. Efficient staff sort on the board and the advantages of this method are that there is a minimum of handling and the shorter crutch and belly wool is not mixed with the better length body wool. In handling good lambs' wool attention must be given to the separation of yellow belly wool, off-coloured lots, and lots containing burr, seed, or brands. Straight "steely" or shiny britch wool should always be separated from good lines.

Where any but fully experienced shed hands are employed it is advisable to remove all brooms except the one used for general sweeping from the shed. New shed hands usually sort lambs' wool and crutchings better with a strip of hardboard. One board only should be used, as a "green" worker with a board in each hand tends to scoop all sorts into a heap and expect somebody to unravel a blend that should not have been made.

Demonstrating how a fleece can be thrown to unfold evenly to spread flat over the wool table with the neck at the far end of the table. To illustrate this throw the camera was held below the level of the wool table.

Crutchings

How much sorting of crutchings should be done in the shearing shed is a much debated point, but prices indicate that it pays in the average shed to sort out the good body wool, shorts, and stains. Some good lines of crutchings from woolly headed flocks are spoilt by the inclusion of face pieces, which should be removed on the shearing board when any clearing of the face or eyes is done at crutching.

Usually it is best to sort crutchings on the shearing board, because there it is fairly simple to separate the odds and shorts. All stains should be removed. Where bellies or part bellies are removed at crutching provision must be made for this distinctive type of wool. The same applies to fly crutchings, which, because they are usually short, are often over-sorted.

Where the clip is large enough it is wise to sort out a top line of the longest, cleanest, brightest, and best crutchings. If a large flock shows a considerable amount of strong britch wool, it may be profitable to separate the long, coarse crutchings, as they are often keenly sought.

Hogget crutchings should be kept separate. Face pieces, stains, and leg pads should be forwarded to the broker, who has bins suitable for these odd lines. All odd lots can go in the one bale or fadge branded "Bin"; provided the various lots have been separated (a paper division is sufficient), the broker will dispose of them to best advantage.

A SINGLE LAM-BAR
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AT A TIME

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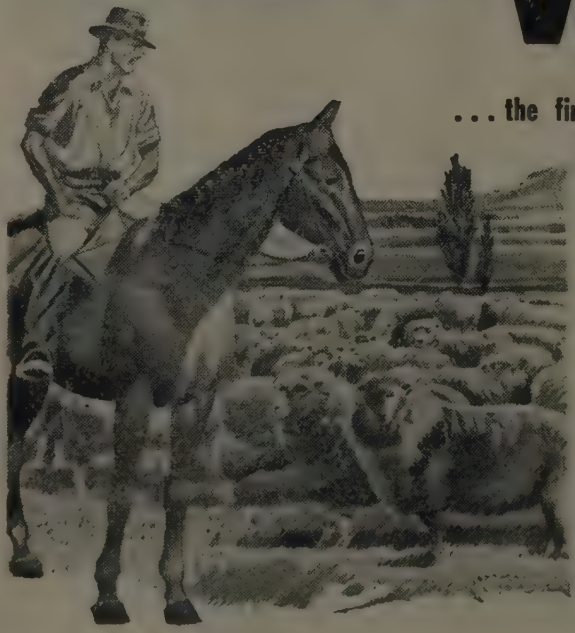

. . . the finest Quality Sheep Branding Fluid in N.Z.

Vacmark is legible, long-lasting. Vacmark will not wash off the fleece even if rain comes after the brand has been applied. Takes perfectly to a wet fleece.

Vacmark scours out completely. Vacmark washes out easily in wool scouring works. There is no staining or damage to the wool.

Vacmark is easily applied. Vacmark can be used with a conventional branding iron or automatic branding pad.

Vacmark has four bright colours. Vacmark is sold in four colours — black, red, blue and green. The colour of Vacmark in the tin is not a true indication of the final colour of the brand. A few days after application, the brand brightens considerably.

Vacmark is economical. One gallon of Vacmark will brand about 600 sheep.

Vacmark is fully approved. All colours of Vacmark are approved by the New Zealand Department of Agriculture as wool marking preparations for the purposes of the Stock Act, 1908.

Available from all stock and station agents.

Shearer looping the neck, a bad habit that retards and lowers the standard of shed work.

The fleece picked up. The looped neck hangs down in front of the fleeco.

As the fleeco moves to throw the fleece the looped neck usually catches on the end of the table.

Some shearers adopt a crutching style that mixes all the short crutch wool, stained, and good-length wool; some fast shearers toss out any belly wool, more or less leave the short inside crutch wool where it is easily separated from the long body wool, and then brush off any head wool that is shorn off.

Second Shear

Second shear is a fairly loose term used to describe wool from sheep shorn more than once in a season. If there is less than 8 months' growth, the wool usually fails to hold together and must then be handled in a manner similar to that used for lambs' wool. The principal lots will be body wool, pieces, and bellies and these can be separated efficiently only in the woolshed during shearing.

As with lambs' wool length is important. A brought-in line of sheep will have to be dealt with separately if they have different wool length from the main flock.

In the woolshed it should be assumed that wool under 3in. long is one type and wool over 3in. another. Second-shear wool from hoggets and mature sheep should be kept separate as should any odd lots that would spoil the colour of the main line.

Second shear of over 9 months' growth may hold together and in that case it is handled as fleece wool.

What can happen to even a well-thrown fleece when the looped neck hits the centre of the table.

Use of Tar

Tar is a menace on or near wool and should be kept away from all shearing sheds. A common practice is to apply tar to all shearing cuts, but it is not a desirable dressing and will not prevent fly strike. If growers feel that it is essential to dress shear cuts, something that is not harmful to wool must be used.

It is illegal to use tar for wool marking.

Pressing

Fleeces must be placed in the press correctly. A very common fault is to

A Johnson's Fence means

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Johnson's English Wire, drawn with the skill of 150 years' experience, is protected by patented Hot Dip Galvanising. This ensures long life in New Zealand's climatic conditions and it is particularly resistant to the corrosive action of salt-laden air.

Johnson's 12½ gauge Super Dreadnought is economical for high country. It yields 1,458 yards to the hundredweight as compared with 546 yards for 8 gauge and has equivalent breaking strength.

JOHNSON'S ENGLISH FENCING WIRE

MANUFACTURED BY: RICHARD JOHNSON & NEPHEW LTD. MANCHESTER, ENGLAND.

OBTAINABLE FROM STOCK & STATION AGENTS & HARDWARE MERCHANTS EVERYWHERE.

SOLE NEW ZEALAND AGENTS:

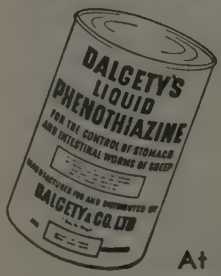
JOSEPH NATHAN & COMPANY (N.Z.) LTD.

WELLINGTON AUCKLAND CHRISTCHURCH SP.563A

PROTECT THAT HEALTHY FLOCK!

For Maximum Kill of Intestinal Worms, Drench with Dalgety's Fine Particle

LIQUID PHENOTHIAZINE



Sure protection means sure profits! Keen shepherds use Dalgety's Liquid Phenothiazine for sure control of stomach and intestinal worms because it possesses the six essentials of a SAFE, EFFECTIVE, ECONOMICAL drench. (1) It is ready mixed. (2) Stays in suspension. (3) Does not cake. (4) Gives even doses. (5) One stirring lasts all day. (6) Can be used with any standard gun or pistolet.

— Also Available in Tablets or Powder —

At all Branches of **Dalgety**

AND COMPANY LIMITED

(Incorporated in England)

Skirting a well-thrown fleece. This type of throwing usually reduces skirting time by a third.

Another fault in shearing. Here the shearer has taken off a narrow belly (a strip of belly wool on either side of the fleece is held by the fleecos). No belly wool should reach the wool table, where it could be skirted in with good pieces. It should come off intact on the shearing board.

put a fleece in each corner and then another in the middle. If the fleeces are big, one in each corner is good practice, but one in the centre is bad, as the centre fleece ties the others together, makes bin or reclass handling difficult, and often causes the entire bale to be torn apart and an unnecessary extra lot of pieces.

When pressing big fleeces place one in each corner of the press, tramp them down, and add another layer of four. Place smaller fleeces in the press in two rows of three, making six fleeces in each layer.

Pressing often receives less attention than it warrants. Farmers would be surprised at the answers if they asked their young staff what length of pack fitted the usual-type wool press. Many of the younger hands have not handled or even seen any but the short pack common today; they do not realise that many presses were built to take long, medium, and short packs.

Younger farmers and shed hands may have some excuse for not using a false bottom in the press for medium packs and for failing to do the additional packing of the false bottom necessary for short packs, but older farmers cannot justify the sending away of badly pressed, round-ended bales. Round-butted bales resulting from the use of short packs in a long press without the false bottom sufficiently packed are difficult to load compactly, cause much heart-burning and unnecessary labour in every phase of handling, and are dangerous in wool stores.

Over-pressing of good wool, particularly good lambs' wool and crutchings, is often false economy, though underpressing makes bales difficult to handle and stack safely. One way of packing a good bale and striking an

An excellent type of wool table. It is very strong, has no fixed legs to become ricketty, and is easily dismantled. It is 8ft. 6in. x 4ft. 6in. x 2ft. 9in. high with 1in. battens 1½in. apart.

average weight is to place fleeces in the press systematically and keep a tally. If an average skirted fleece weighs 7lb., about 50 fleeces will make a good bale. Good lambs' wool and good crutchings do not show well if pressed in bales of over 300lb.

The maximum bale weight permitted by law is 400lb. for fleece wool and 450lb. for oddments.

Sewing and Branding Bales

The manner in which bales are sewn is often a good guide to shed workmanship, good, even stitches showing interest in the work. Where a bale is marked for bin or reclass good, tight sewing with an ordinary loop or running stitch is sufficient, but where the bale is part of a main line destined for the show floor the stitching should be done with a lock stitch. The corners should be pulled together neatly and firmly and the next stitch should be a firm lock stitch 4in. from the corner.

Bales shown for sale are cut to within 4in. of the corner, and a lock stitch there saves considerable time and labour. Eight stitches to each side will provide good sewing.

Branding

Branding should be done in 3in. letters on the cap and one side only of the bale.

Incorrect marking is amazingly common: Fleece wool is branded as bellies, pieces, etc., and vice versa, causing much unnecessary rehandling and disruption of show stacks. With farm-classed and unclassed lines bales of good wool could be sold as lower-priced lots, as not all bales are opened.

Branding and numbering should be done by or supervised by a responsible person. A correct specification sheet provides a valuable check for the seller.

Branding stencils should be neat and clearly defined and the brand applied with a fluid of correct consistency. Stencil numbers should be of the type which prevents confusion.

When branding, an area in the centre of the cap 6in. in diameter should be left unmarked, because type brands or numbers placed on the centre of the arched cap tend to smudge or rub off in transit. The following are abbreviations used to denote the various types of wool and oddments:—

Bellies		BLS
Belly crutchings	BLS	CRT
Binned		BIN
Black wool		BK
Border Leicester		B/L
Brands		BDS
Corriedale		COR
Cotted		COT
Cheviot		CVT
Crossbred		XBD
Crutchings		CRT
Dead wool		DD
Dingy		DGY
English Leicester		E/L
Ewe		E
Eye clips or face wool		E/C
Fine		F
Fleece		FLE
Hogget (shorn)		H
Hogget (woolly)		HOG
Half-bred		½Bd
Lamb crutchings		L/CRS
Lambs		LBS
Lincoln		LCN
Lincoln cross		LCN/X
Locks		LOX
Merino		MER
Necks		NKS
Pieces		PCS
Rams		R
Reclass		r/c
Ryeland		RYL
*Second shear		2SH
Second shear bellies	2SH	BLS
Second shear pieces	2SH	PCS
Southdown		S/D
Southdown bellies and pieces	S/D	B/P
Stained		STD
Suffolk		SUF
Wether		W

* Mark ewe, wether, or ram: 2SH E, 2SH W, or 2SH R.

Station Brands

In the making up of wool catalogues and various report sheets growers' brands must be repeated and stencilled many times. New wool growers or growers changing their brands could save considerable time and labour by choosing brands that can be typed on an ordinary typewriter. Brands often have awkward flourishes, "eye-brows", hooks, and joined letters which could be eliminated. They entail hand work and extra time at a very busy period.

Specification Sheet

The specification sheet is much neglected. Many growers fail to complete this very important document, which, when properly made out, assists both the grower and selling agent. Correct details give vital storage and stacking information and allow for quick adjustment of branding errors. It is definitely in the grower's interest to complete this sheet and forward it with his wool or before dispatching it. The grower should state whether the consignment completes the line or about how many bales are yet to be forwarded. The specification sheet should be made out by the owner or classer, not by pressers. If pressers make out specification sheets, branding errors are likely to be repeated.

The load of bales when dispatched from the grower's woolshed should be covered, irrespective of the weather. In dry weather dust penetrates the packs, and no chance must be taken of getting wool wet.

Shed Hands Required

Assuming that the average clip is of good style, the requirement of shed hands will be one to approximately 175 sheep shorn in a shed with a long shearing board with outside ports, and one shed hand to approximately 200 sheep in a chute-type shed with the shearing board and wool room combined.

Basing the number of shed hands on the number of shearers does not lead to economic use of labour, because the amount of work to be done by shed hands will vary according to the shearing rate.

Illogical Assessment

The illogical assessment of "one shearer, one shed hand" has caused considerable worry to owners of good wool who also employ fast shearing gangs. They are expecting the shed hands to do the impossible. The style of wool handled can be a further complication. Where the clip is of poor colour, very seedy, burry or sandy, and generally of low style a minimum of shed work is required, but good-styled wools require all the attention necessary to present them in the best marketable manner.

As an example of the staff required a 4-stand shed with shearers averaging 175 sheep a day would probably need 4 shearers, 4 shed hands, 1 presser, 1 presser-sheepo, and one cook. If the shearers averaged 200 sheep a day, an extra shed hand would be required to handle good wool efficiently. With 800 fleeces to be picked up, thrown on to the table, skirted, and rolled, each fleece must be handled in 40½ seconds. Actually one fully trained shed hand working on good-style wool is fully extended to deal with 200 fleeces a day. Therefore 175 sheep with good wool in a moderately well laid out shed is about the limit per day of an average shed hand, but improved woolshed design, such as that now being devised by the Sheep and Wool Section of the Department of Agriculture, may raise the figure.

Impossible Task

In some sheds where fast gangs are employed shed hands are being expected to perform an impossible task. This emphasises a peculiarity of the award, under which shearers are paid by tally but shed hands by the hour.

About four shearing stands can supply enough fleeces to occupy one wool table fully. This may explain why some of the 6- and 8-stand sheds with long shearing boards find extreme difficulty in giving a good clip the attention it warrants.

Generalisations can be misleading, but it is reasonable to assess the number of shed hands required to handle good wool at one to every 175 sheep through the porthole daily, provided the local circumstances and type of woolshed are taken into consideration. The system of all shed hands changing position at the end of a run is unwise. One experienced hand should always be kept on the wool table. That is easily arranged where the table hands change position only one at a time.

Feeding and Management of Household Poultry in Laying Cages

A DESCRIPTION of different types of laying cages suitable for use by household poultry keepers and of the advantages obtained from their use was given in the September issue of the "Journal" by P. Josland, Poultry Instructor, Department of Agriculture, Wellington, and in this article he discusses the feeding and management of poultry kept under this system.

THE success of any poultry venture, whether commercial or domestic, depends very largely on the birds' diet. The nutritional quality of the feed rather than the system of feeding determines the health and production of a flock. This applies particularly when laying cages are being used.

Birds that have been bred for liveability and layability cannot be expected to remain healthy and lay well on a deficient diet. The ration must be nutritionally complete, especially in the protein, vitamin, and mineral requirements, as poultry kept in laying cages have no opportunity to supplement these essential ingredients by foraging or from the full benefits of sunlight.

Protein

For normal growth, maintenance, and production a laying pullet requires a diet containing 15 to 16 per cent. protein. This can be supplied by the householder in three ways.

1. By an all-mash ration (no whole grain is fed). To 10lb. of No. 1 laying mash (this contains 10 per cent. meat meal) add ¼lb. of meat meal. Alternatively, to 10lb. of No. 2 laying mash (this contains no meat meal) add 1¼lb. of meat meal.

2. By a mash and grain ration. To 10lb. of No. 1 laying mash add 1¼lb. of meat meal. Alternatively, to 10lb. of No. 2 laying mash add 2¼lb. of meat meal.

3. The easiest method for the householder to supply the flock's protein requirements is to provide space in the feed hopper for the protein—supplementing meat meal. The birds are then able to balance their own protein level. It has been proved experimentally and in practice commercially that poultry fed a free-choice ration will select feed and balance their own nutritional requirements. When protein is provided ad lib. there is a tendency at first for the birds to gorge themselves. However, this soon stops and the birds settle down and eat only their requirements.

Vitamins A and D_3

Fortunately for the commercial and household poultry keeper most of the vitamins discovered and considered necessary for reproduction, health, and production are contained in the cereal grains and their by-products, and these constitute the bulk of the rations used in New Zealand.

The chief vitamins that are of demonstrated importance and that are deficient in rations are vitamins A and D_3. These must be supplied for health and production. Fish-liver oils or emulsions are rich sources of these vitamins and are available.

As the vitamin potency of different brands varies, the makers' feeding recommendations should be strictly adhered to. The recommendation for an oil containing 1000 international units of vitamin A and 100 international units of vitamin D_3 is ⅔ pint to 100lb. of total feed, 3 tablespoons (1½oz.) to 10lb., or 1 tablespoon per day for 10 to 12 birds. The oil can be mixed into the mash or grain.

Minerals

Calcium is the only mineral the household poultry keeper need be concerned with. Calcium is the chief constituent of egg shells and with vitamin D_3 is responsible for sound shell quality.

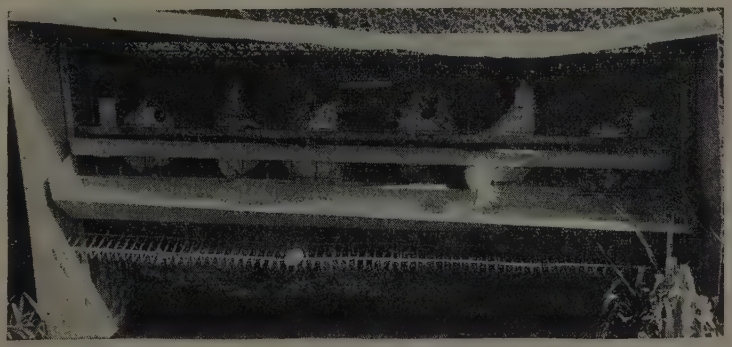
The usual method of supplying this essential mineral is in the form of a soluble grit (oyster shell or limestone) and it is made available to the birds in a separate hopper. In cages oyster-shell grit can be sprinkled on top of the food. It is necessary to supply calcium ad lib. because individual requirements vary, depending on the rate of production. Most laying mashes contain 2 per cent. ground limestone. This amount should be doubled for birds in cages.

Hard Grit

Poultry require a supply of an insoluble grit in addition to the soluble oyster-shell or limestone grit. Hard metal grit acts as a grinding agent in the gizzard and aids digestion. Consequently, utilisation of feed is more efficient. The grit can be made available separately or sprinkled on top of the mash occasionally.

Fresh Greens or Lucerne Meal

The householder is usually able to supply his layers with a daily feed of fresh greens, and this is essential to obtain rich-coloured yolks. However, lucerne meal could be included in the mash, ½lb. to 10lb. of mash. Good-quality dehydrated lucerne meal is a valuable addition to a poultry ration. It is a substitute for greenfeed, supplying carotene, from which a bird can make vitamin A, and it also contains the colouring pigment xanthophyll, the agent responsible for rich yolk colour.



A six-bird cage unit, showing feed hopper and water trough. To avoid waste the feed hopper is not filled to capacity.

Water

A constant supply of fresh, clean water is of the utmost importance. A 2lb. jam jar per bird would be a suitable container, or a length of galvanised spouting running the full length of the cages could be used. The water containers should never be allowed to become empty, as a lack of water will adversely affect the birds.

Feeding Systems

The numerous feeding systems used by household poultry keepers are satisfactory when used with birds in laying cages. However, to enable the householder to make the most efficient use of cages the system of feeding adopted should be as simple as possible and entail a minimum of labour. Three systems of feeding poultry, all giving satisfactory results, may be considered. They are:—

1. All dry mash.
2. Laying pellets.
3. Dry mash and grain.

All Dry Mash

Feeding with all dry mash is a simple system and is the most common method of feeding birds in laying cages. The dry mash is continuously available to the flock. To avoid wastage with dry mash feeding the hopper should not be filled to more than two-thirds of its capacity. This will prevent some birds from dragging the food out with their heads. However, there is generally the odd bird that will waste mash despite all precautions.

To encourage consumption of dry mash by birds in laying cages the mash should be stirred and levelled daily, more being added when required.

When the hoppers are being topped with fresh food the mash remaining in the hoppers should be pushed to each end. This prevents the older mash from being continually covered by fresh food and becoming stale. Stale food may cause digestive upsets and reduce egg production.

Laying Pellets

Pellet feeding is a modified version of dry mash feeding. Pellets are made from dry mash compressed under high pressure into cylindrical shapes. The size varies for young stock and layers. Vitalised layers' pellets are nutritionally complete for use by the household poultry keeper and can be fed without the additions of vitamin A and D_3 and extra protein. Oystershell grit ad lib. is necessary to supply calcium. Lucerne meal is sometimes included in the pellets also. However, these points should be ascertained when the pellets are bought to make sure the right ones are obtained. Pellets are best fed ad lib. and as with dry mash feeding the hoppers should not be overfilled.

Dry Mash and Grain

Grain can be fed to birds in laying cages if desired, but it should be remembered that the protein content of the mash has to be increased. The additions required are given earlier under "Protein".

Feeding Rules

For success with a system of feeding the householder should observe the following rules:—

1. Feed a well-balanced ration.
2. Do not control food intake too rigidly.
3. Do not change from one system to another, particularly during winter. Changes are best made with the new season's stock and then should be made gradually.

As long as results are good the system of feeding should not be changed.

Internal and External Parasites

Though birds are being kept in cages, they may still suffer from internal and external parasites such as worms and mites and lice.

Roundworms

The majority of household poultry keepers buy their stock as perching or near-the-lay pullets, and it is easy to ascertain from the poultry farmer whether the pullets have been dewormed. If not, they can be treated before they are housed in their new quarters.

The dosage for perching pullets 8 to 10 weeks old is 1 c.c. capsule of carbon tetrachloride per bird. For pullets near the lay two 1 c.c. capsules are required. Once birds have been treated in cages the chance of reinfestation is slight, as the birds have no access to their droppings.

Red Mite

It is a good plan to inspect the cage fittings occasionally for the presence of the blood-sucking parasite red mite. The mites live in any crack or crevice, in wood or metal, and only go to the birds at night for blood. They are red or grey in colour, depending on whether they have been feeding. It is a wise precaution to spray the cages before use, and at the annual clean up, with kerosene. When the wooden framework for the cages is being made care should be taken to treat it, particularly the joins, with a heavy application of creosote.

Lice

A periodical check should be made for the presence of body lice. This irritating pest lives on the bird and is easily detected if the feathers around the vent are spread.

A few drops only of black leaf 40 are required around the vent and under each wing to deal with the lice. This treatment will not kill the eggs and the treatment should be repeated in 10 days to kill the lice that have since hatched. To avoid handling each bird individually black leaf 40 can be applied to the scales of the legs with a feather fastened to the end of a stick.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during July 1957 and for the 12 months ended 31 July 1957 with comparative figures for the same month and the 12 months of 1955-56 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage inc. or dec.
July 1957	2,172	5	2,177	—
July 1956	2,308	6	2,314	—
Increase or decrease	—136	—1	—137	—5.920
12 months ended 31/7/57	154,161	2,909	157,070	—
12 months ended 31/7/56	162,189	2,961	165,150	—
Increase or decrease	—8,028	—52	—8,080	—4.892

Butter in store at 31 July 1957 was 12,364 tons

Note: In the 3 months January-March 3,990 tons of ice cream base were graded for export at Auckland, but not included in the butterfat figures.

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage inc. or dec.
July 1957	37	—	37	—
July 1956	32	—	32	—
Increase or decrease	+5	—	+5	+15.625
12 months ended 31/7/57	79,823	10,357	90,180	—
12 months ended 31/7/56	79,428	12,702	92,130	—
Increase or decrease	+395	—2,345	—1,950	—2.116

Cheese in store at 31 July 1957 was 11,918 tons

If these figures are converted into butterfat equivalent, there is a decrease of 4.335 per cent. in butterfat graded for the 12 months as compared with the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time they are not necessarily a true indication of production trends.

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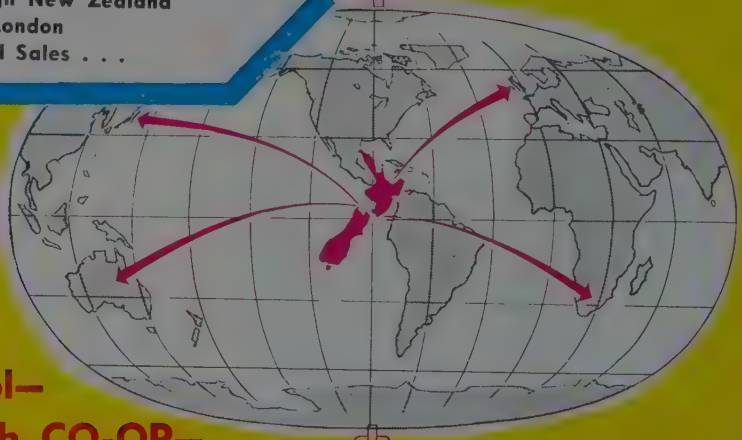

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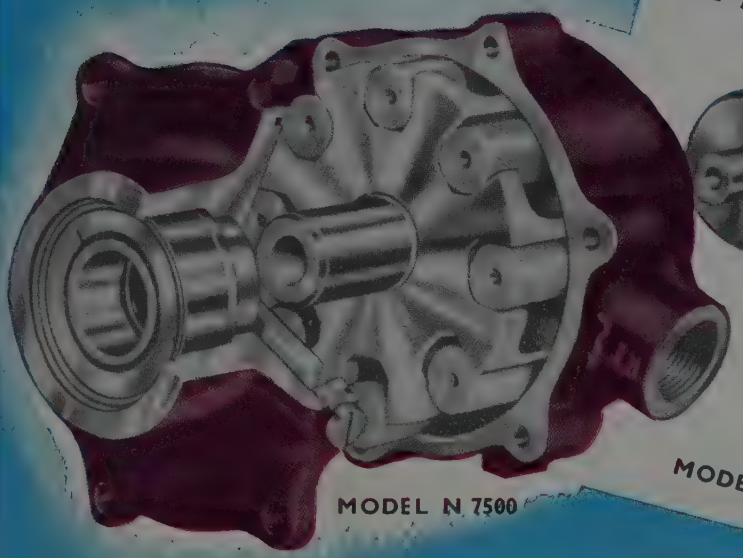
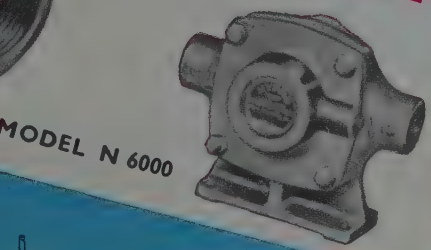


MODEL N 7500



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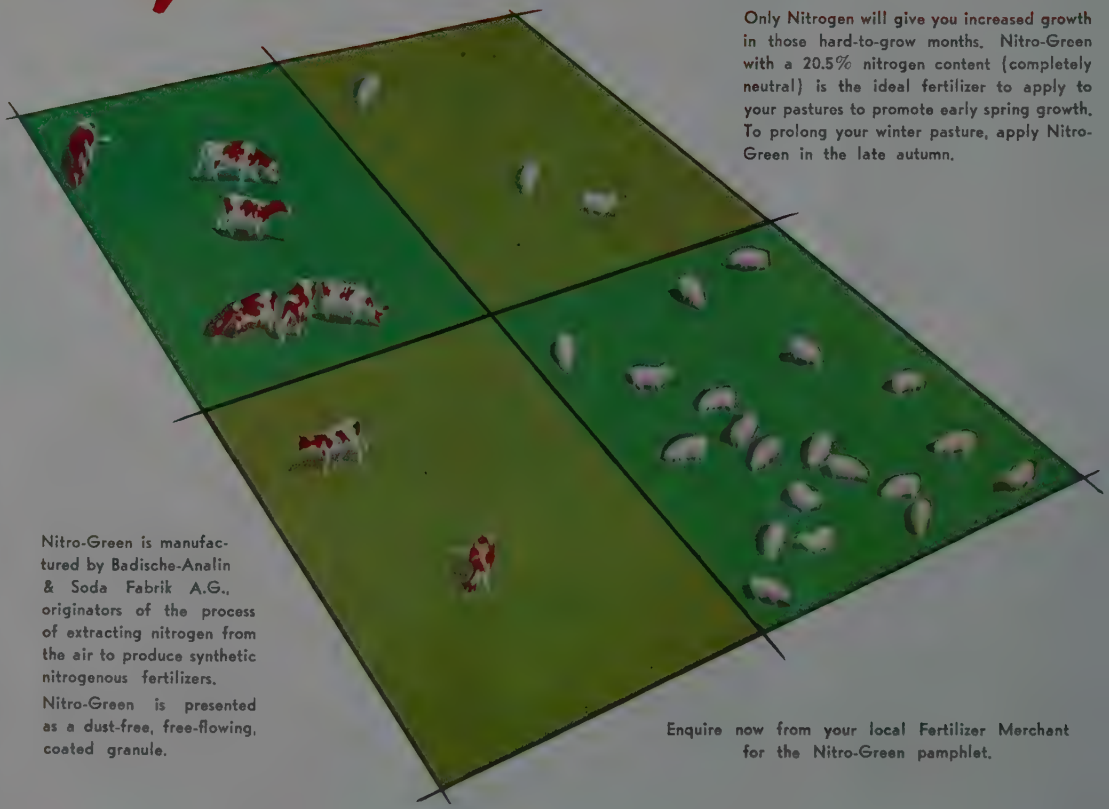

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Crops for Facial Eczema Control

By H. McM. BULL,
Instructor in Agriculture, Department of Agriculture, Auckland

Where the soil is suitable chou moellier is the best crop to grow for facial eczema control.

ENSURING that stock do not eat toxic pastures is at present the only method of preventing facial eczema. This may mean that heavy concentrations of animals have to be held on bare paddocks, which is obviously undesirable at times when lambs should be fattened, ewes flushed before tupping, or dairy herd production maintained. The only alternative is to have available in summer and autumn fodder crops which have been proved to be safe. Crops suitable for use under conditions when facial eczema precautions become necessary are described in this article, which was adapted from a paper given at the Ruakura Farmers' Conference.

OBVIOUSLY the ideal crop to grow for facial eczema control would be some form of leafy, succulent cabbage that would grow night and day without any moisture in the topsoil and in prolonged hot weather. In this atomic age nothing appears to be impossible, but as yet no such plant has been developed. What is needed is a plant that can stand on-and-off feeding during the dry months of February, March, and sometimes April, when eczema is liable to occur. It must be palatable, reasonably high in feeding value, and with the ability to put out fresh growth after heavy, close stocking. Nor should it be one of those crops that require exceptional standards of fertility which confine its usefulness to some select and limited area.

Three Suitable Forage Plants

Three well-known forage plants qualify in this field as far as regrowth is concerned. They are chou moellier, thousand-headed kale, and rape. Turnips are not included in this group, for though they are probably as good a crop as any to grow, once the leaves are nipped down to the crown of the bulb little or no regrowth can be expected.

Chou Moellier

Chou moellier is placed first in the list of recommendations for several reasons. In the South Auckland area alone in the 1954-55 season 1000 more acres were sown than in the previous year—from 7000 to 8000 acres. In fattening qualities it does not compare with well-ripened rape, and it may not give as heavy a yield of dry matter per acre as a healthy crop of swedes. Generally, however, its feeding value is higher than that of an equivalent weight of turnips or swedes. However, one of the main reasons for its increasing popularity is that it has proved a safer crop to grow than swedes, turnips, or rape through being less susceptible to pests and diseases.

As a member of the cabbage family, chou moellier is best suited for high-fertility soils—first-class alluvial silts in areas of higher rainfall and soils which also hold moisture well but are not liable to over-saturation. However, not every farmer is privileged to farm this type of ground and what he lacks in natural fertility he must be prepared to make up for out of the fertiliser bag. With liberal manuring and cultivation, good production can be obtained on medium loams and clays if the weather is favourable. Very rarely can a good crop be grown on a paddock that has carried a very low-producing pasture. Soft turnips are more reliable here.

A suggested fertiliser mixture for chou moellier is 4 parts of serpentine superphosphate, 1 part of potash, and 1 part of either sulphate of ammonia or blood and bone at 6cwt. per acre. Where the seed is being drilled, or even broadcast, serpentine superphosphate alone should be used to avoid germination injury. Trial work has

← Rape when mature supplies the most complete and well-balanced ration for fattening sheep available from any fodder crop but unfortunately is not sufficiently reliable.

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shown that straight superphosphate, sulphate of ammonia, and potash when kept for even a few hours in close contact with the seed all endanger germination.

Wet, cold conditions just after sowing will rot much of the seed. Under conditions of high fertility and high rainfall the crop will give exceptionally heavy yields (about 50 to 60 tons per acre). Yields are closely tied up with drill widths, seeding rates, and weeds, with weeds the predominant factor.

Trials at Massey Agricultural College have shown that the weed control which is possible where crops are sown in widely spaced rows is important in increasing yields, even up to 30 per cent. On the other hand, if weeds are not a problem, closely spaced rows, say 7in., will be likely to produce the heaviest crop. In Massey College trials 2½lb. of seed per acre in 28in. rows gave a crop with reasonably thin stalks and allowed a high rate of utilisation of the whole plant. The college has found, too, that at least one cultivation is necessary as soon as the seedlings appear in the rows to check weed growth and allow the chou moellier plants to overshadow the new batch of weed seedlings that germinate.

At Tirau 6 acres of chou moellier sown in 28in. rows for cows (1 acre for every 10 cows for feeding from January to April) was cut with a mower and fed out at approximately 70lb. per cow per day in conjunction with a field of red clover. The final weight of this crop was 50 tons per acre.

For sheep, sowing in 14in. drills seems preferable. To estimate how many acres should be provided as an insurance against eczema is not easy. The number of hoggets complicates matters, as they would be on part of the crop all the time during a dangerous period and the ewes would be rationed on and off bare ground with a ration of hay. Ruakura Animal Research Station suggests that with a medium crop 10 acres is needed for about 1000 ewes, 200-odd hoggets, and 25 rams.

White-fleshed turnips are highly recommended because of their ability to grow useful feed under a wide range of soil and climate. The variety shown is N.Z. York Globe.

As chou moellier takes 3½ to 4 months to mature it should be sown in early October to obtain the benefit of moisture to push it along and the necessary long period to develop plenty of mature leaf by January. Though recognised as a crop that can be fed safely over long periods without causing dietary upsets, chou moellier sometimes causes trouble. However, when summer feeding only is concerned the only danger may be lack of maturity in the leaf brought about by wet weather causing the crop to keep on growing and the lambs to go back. The remedy here is to remove the lambs until drier conditions harden the leaf.

Sheep should at all times graze the standing crop either with a run-off or in breaks. For dairy cows the crop is generally cut and fed out, which reduces the loss by tramping and makes possible some measure of rationing. Chou moellier is considered more palatable when cut 24 hours before being fed out.

Thousand-headed Kale

Thousand-headed kale, like chou moellier, produces best on heavy soils, but is more widely grown on the poorer soils than is chou moellier. It will definitely not tolerate ground which tends to become waterlogged. On the other hand it compensates by producing a useful amount of feed in relatively droughty periods. It is handled somewhat differently from chou moellier and that governs the time of sowing, which is usually about October.

Chou moellier has a single, thick, fleshy stem which is palatable and low in fibre content; it has a high proportion of stem to leaf and large, thick, fleshy leaves which fall during winter. It provides autumn and winter feeding but spring recovery is poor. The forage yield is very high, the dry matter content being about 13 per cent.

By comparison thousand-headed kale has several hard, woody, unpalatable stems. It has a high fibre content, a low proportion of stem to leaf, and numerous lateral bearing leaves. Leaves are retained in spring. Kale provides winter and spring feeding and has good spring recovery, but its yield is lower than that of chou moellier and the dry matter content is 15 per cent.

Both plants are drought resistant and both are resistant to club root, aphids, and diamond-backed moth.

Kale takes a full 12 months to reach maturity and it is in the second spring

Mixed crop of chou moellier and kale. Grazing difficulties associated with kale may be overcome by the use of this mixture.

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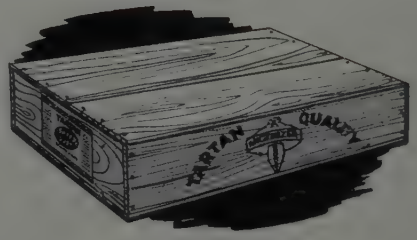

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that the most feed and the most palatable feed is produced. Further its ability to recover after autumn grazing excels that of all other crops. With kale, therefore, a farmer has two strings to his bow; in February and March an eczema precaution and in early spring valuable feed for his ewes.

Many farmers will not grow kale, because they claim that they have to starve their lambs on to it in autumn. This may be true, but if lambs are not small, weak, and weedy, they can be induced to start eating it reasonably soon either by putting on a large mob with no run-off or by disguising the kale with a certain proportion of chou moellier. Two half-and-half crops seen by the author had been eaten down evenly. One would think that an old ewe would exchange her patch of bare ground and a few pieces of hay at any time for the free run of a paddock of kale.

Chou moellier is the best crop for eczema precautions, but this point has to be considered: To have a crop ready at its best by 1 February it should be sown in October. By July an October-sown crop will not be much use. It will become woody with not much regrowth after autumn feeding, especially if it has been eaten down hard, and there will be some rot in the open stems. Because of this chou moellier areas will probably be resown to grass in autumn. With kale sown in October and given the same treatment as chou moellier there will be this difference: The stems being whippy and unpalatable are largely left to send out plenty of palatable leaf growth. This may come in very handy for the ewe flock about August or for tail-enders that are doing poorly.

Rape

In some districts rape is a risky crop. However, if all goes well it supplies, when mature, the most complete and well-balanced ration for fattening sheep available from any fodder crop. On the other hand many things can go wrong with it. In a wet summer it will not ripen and scalds the lambs. If it is kept too long, it becomes fibrous and indigestible, and if the weather is very dry, with eczema in the offing, it can easily be heavily infested with aphids. Even if these setbacks are avoided, the crop may still have club root. Because of the problems associated with the growing of this crop it is not sufficiently reliable for the purpose with which this article deals.

Turnips

White-fleshed turnips can be grown successfully over a wider range of soil and climatic conditions than swedes, chou moellier, kale, or rape. In 1954-55 over 30,000 acres were sown in South Auckland.

White-fleshed turnips develop rapidly and a succession of sowings enables them to be used for feeding during summer and autumn, when pasture growth dries off. Apart from their feeding and eczema insurance value, white-fleshed turnips are a valuable crop on which to flush ewes. White-fleshed turnips will tolerate greater heat than swedes as long as there is enough moisture in the soil. Hence, if sown in good moisture-holding soils even in December, they will grow on through the heat of January and February.

On stiff clay soils which dry out early a long-keeping variety should be sown early so that it will be well established and with sufficient leaf to cool and cover the ground. When very young turnips are checked through dry weather, it does not take very long for a combination of heat, insects, and perhaps disease to ruin the crop.

Variety trials have shown that for a quick-growing turnip ready in about 10 weeks N.Z. York Globe (for cows) and N.Z. Red Globe (for sheep, as it carries more leaf) are suitable. For a good all-round long-keeping turnip ready within 16 weeks N.Z. Green Globe is recommended. Another long-keeping variety recommended, especially where club root is suspected after a crop of swedes, is the yellow-fleshed variety N.Z. Green Resistant.

Care should be taken not to sow too large an acreage, as the crop may mature too soon to be used to best advantage. This is especially important for dairy farmers, where a continuity of fresh leaf and bulbs is required. For sheep farms it may be safer to sow a long keeper—like N.Z. Green Globe or N.Z. Green Resistant—early and hold it to use either during the eczema period or for flushing. Preferably the sowing should be made in two paddocks or provide for a break to allow feeding off in such a way that the hoggets can be given preference.

As a guide to the acreage needed the area sown on a farm near Auckland carrying 900 crossbred ewes is quoted. Twenty acres of turnips were grown to assist with flushing and as a safeguard against facial eczema. This crop was fed off between 22 February and 8 March in two breaks for only an hour or two per day during flushing, and saved pasture was fed as well. During shut-up periods for facial eczema no saved pasture was used and the only feed was the crop for 2 hours per day and some hay. As this area was ploughed out of hard scrub country, the area sown was bigger than really necessary, in expectation of a light crop.

Best Crops

In the author's experience the best crops to grow for facial eczema control are:—

1. Chou moellier, where the soil is suitable, because of its high feeding value, grazing recovery, and resistance to club root, aphids, and diamond-backed moth.

2. White-fleshed turnips, because of their ability to grow useful feed under a wide soil range and under conditions of heat and dryness.

Grass Round Fencelines

The land should be ploughed as close to fences as possible to bury as much ryegrass as possible. Fairly large areas of unploughable sidings or swamps carrying ryegrass pose an awkward problem on the crop area. Two alternatives can be taken: Either a large mob can be put on to eat and trample the ryegrass down as quickly as possible or the area can be sprayed with a grass weedicide (dalapon at 2lb. to the acre or CIPC at the same rate).

Insect Pests

Insect damage is a serious hazard in the growing of the crops mentioned in this article. White butterfly, diamond-backed moth, aphids, and springtails, if given favourable conditions, will wreck a crop in a few days or weeks.

The most treacherous insect is the springtail, which may strike throughout a district almost overnight. It is a pinhead size wingless hopper and lurks under decayed grass, which is often unavoidable in a worked-down paddock. It is extremely hard to see and it is only the unexplained disappearance of young seedling crops in the neighbourhood which arouses suspicions.

Springtails can be controlled by applying ½lb. of lindane per acre as a spray before sowing the crop. Three or four days is needed to knock out most of the insect population.

White butterfly, diamond-backed moth, and aphids can all be controlled reasonably well by the application of ½lb. of lindane per acre for moderate infestations and 1lb. per acre for heavier infestations before insect damage has affected the thrift of the crop. A second application may be necessary later in the season if reinfestation occurs. The foliage of the crop should be covered with a deposit of the insecticide and this can be done either from the air or the ground. If a ground boom spray outfit is used, apply the insecticide (at the appropriate rate according to the percentage of lindane present) in 30 to 40 gallons of water per acre at 50lb. to 60lb. pressure using M46 jets. This will produce a misty spray which will drift among the foliage and give a reasonable coverage.

Lindane is poisonous. Do not breathe in the spray or allow residue to remain long on the skin. Wear protective clothing, including rubber gloves, and a light respirator that will prevent swallowing of the spray and will protect the eyes.

Care of Livestock during November

Contributed by the Animal Research Division

DRY EWES

IF ewes have not already been removed from the flock, they should be separated immediately. It is a good plan to shear them, and during shearing they should be inspected carefully for udder abnormalities. All ewes whose udders were empty at lambing and ewes with diseased udders, damaged teats, very large teats, very small teats, or badly placed teats should be culled. Dry ewes with defective mouths and old ewes which did not have a lamb this year should also be culled.

Dry ewes which are retained should not be allowed to get too fat during summer. If kept in hard store condition, they are more likely to hold when mated next autumn.

CONTROL OF FAT LAMB PASTURE

Pastures on which ewes and lambs are grazing should never be allowed to become rank. If pastures are getting too long, they can best be controlled by cattle. Yearling beef cattle soon become quiet and they can then be run with ewes and lambs even in small paddocks.

SHEARING PREPARATIONS

Preparations for shearing should be made now. Attend to sheepyards and scrub out the woolshed. This will reduce trouble from such diseases as blood poisoning, tetanus, and caseous lymphadenitis ("lympho") after shearing. Check over all machinery to see all parts are in good working order. Dag all dirty sheep and shear hoggets, wethers, dry ewes, and rams.

When culling sheep before shearing pay particular attention to teeth, udder, and dropped belly. On fat lamb farms ewes are best shorn after one or two drafts of lambs are away.

[*Niederer*

Dry sows should have access to good pasture and in addition should receive from 2 to 4 gallons of milk daily, depending on their condition.

Injecting contagious abortion vaccine.

DIP RAMS EARLY

Rams should be dipped before they begin to flush, preferably before Christmas; flushed rams sometimes scald after dipping.

CARE OF PIGS

Dry sows should have access to good pasture and in addition should receive from 2 to 4 gallons of milk per day, depending on their condition. They should be kept thriving, but not allowed to become too fat. Keep only as many of the spring litters for baconers as can be fed adequately; the remainder should be sold as porkers.

VACCINATION AGAINST CONTAGIOUS ABORTION

Vaccination has reduced the New Zealand average rate of abortion in dairy cows from about 5 per cent. to 1 per cent. There are, however, still too many dairy farmers who do not vaccinate their calves. Past freedom from abortion is no excuse for not vaccinating, as infection may be introduced into a herd at any time.

Though vaccination does not begin until January or February, applications should be made now, as veterinarians and Livestock Instructors have to plan their vaccination itineraries. Late applications make this planning difficult. Calves should not be vaccinated until they are over 4 months. Poor immunity results if they are vaccinated before this.

GRAZING MANAGEMENT OF DAIRY PASTURES

During the season of maximum grass growth the problem is to control pastures at their most leafy, nutritious stage. This is best achieved by conserving all growth surplus to requirements as silage and hay. Later in the season it is important to maintain sufficient pasture cover to ensure growth during the dry, summer period. As grass growth declines the periods in which paddocks are spelled between grazings should gradually be increased and as much silage as the cows will clean up should be fed out.

Crop and Pasture Management

Seasonal Notes by the Extension Division

IN the South Island various diseases are taking a severe toll of turnip and swede crops. These notes discuss resistant varieties of turnips and swedes and alternative crops to rape for summer feed.

Attention should now be given to ragwort control and to the management necessary to encourage the spread of clovers on hill country.

CROPS FOR SUMMER FEEDING

IN the South Island rape is still the major summer fattening crop for lambs and sheep, but trials with a mixture of Borre lupins and rape show that in a dry season this mixture is likely to be better than rape alone. Farmers on light land are turning to lucerne and lucerne-cocksfoot for summer feed. The failure of turnips in many areas in the last two seasons through the mosaic virus has reduced the possible value of this crop for summer-early autumn feed. However, a mixture of the quick maturing York Globe turnips with either Italian or short-rotation ryegrass sown in October will give excellent summer feed. If the turnips fail, the ryegrass is still there.

The use of greenfeed maize on some Canterbury dairy farms for late summer-early autumn feed has shown that on good land this crop is an excellent safeguard against summer drought. Other greenfeed cereals which can be used for late summer feed if sown in early December are varieties of oats, such as Algerians, Russet, Abundance, and greenfeed barley varieties.

—P. R. BARRER

* * *

DISEASE RESISTANCE OF TURNIP AND SWEDE VARIETIES

DISEASES such as club root, dry rot, and turnip mosaic often cause serious wastage in turnips and swedes and make the crops an uncertain proposition. Some varieties, owing to their resistance to certain of these diseases, could be used more in the districts where previous experience has revealed their suitability.

CLUB ROOT

No seed of any variety of swede resistant to club root is at present available. Purple Resistant and Green Resistant varieties of yellow-fleshed turnip have a high resistance to club root. Chou moellier is an alternative crop where club root may be expected to be serious.

DRY ROT

Dry rot is usually not conspicuous until the bulbs are fairly well developed. The spores are wind borne and no suitable method to protect the crop can yet be recommended. The disease overwinters on brassica crop residues, such as the stalks of rape, chou moellier, kale, and mummified turnip and swede bulbs. To lessen its incidence the residues of these crops should be buried and kept underground. Wilhelmsburger is the most resistant variety of swede. It can be used for mid- to late feeding, when dry rot can cause much wastage in other varieties.

TURNIP MOSAIC

Turnip mosaic, a virus disease, is spread by aphids. Resistant varieties of swedes are Calder, Sensation, and Wilhelmsburger. All varieties of turnips are susceptible.

—J. O. WALLACE

* * *

INCREASING CLOVER ON HILL COUNTRY

OVERSOWING hill country with 1lb. to 2lb. of white clover or 3lb. to 4lb. of subterranean clover seed per acre seldom results in more than a thin scattering of clover plants over the paddock. It often takes many years under grazing for these clover plants to thicken up sufficiently to give sufficient nitrogen to the grasses to enable them to respond to topdressing as they will when the nitrogen supply is adequate. The scattered clover plants are sought out by the stock, especially the sheep, and are prevented from flowering freely and setting a good seed crop. The practice of spelling newly seeded paddocks, and those where the clovers are too thin to allow for free flowering and seed setting, has been adopted by many hill country farmers with very satisfactory results and can be recommended where it is desired to thicken up the clovers in the sward.

INCREASING SUBTERRANEAN CLOVER

For subterranean clover the paddock should be closed about mid-October so that the plants have a chance to make strong overground runners and bury the seed well away from the parent plants. The spell should continue to the end of December, when a good supply of seed will have ripened and be buried in the soil ready to come away in autumn.

INCREASING WHITE CLOVER

For white clover the spell should be delayed until about the middle of December, up to when the paddock should be kept well grazed to control the grasses. The spell should continue until about mid-February or, in later districts, until the end of the month so that most of the seed will be ripe. It is best to graze the paddock first with cattle, because most of the seed eaten is passed on to the ground in the dung, whereas with sheep grazing a lot of the seed is destroyed in passing through the animal.

—C. J. HAMBLYN

* * *

RAGWORT CONTROL

THOUGH hormone weedkillers have been in use for the control of ragwort for the past 10 years, it is still common to find farmers reporting poor results. Investigation usually shows that this is due to faulty application of the materials, generally through the farmer's trying to get over the ground too quickly, so that insufficient of the weedicide is applied per acre. Recommendations of quantities to use are given at the lowest possible rate needed to give good control, and it is obvious that any reduction in these quantities will lead to unsatisfactory results.

In western Bay of Plenty, where ragwort has always been a problem, most contractors and farmers are using the ethyl ester of 2,4-D applied at 1.3lb. acid equivalent per acre in 25 to 30 gallons of water. Good results are obtained, provided spraying is done in September or early October before the plants begin bolting to seed head. If spraying is done later than this, 1.8lb. to 2lb. acid equivalent per acre will be needed.

One of the most successful contractors in the district uses No. 30 solid cone nozzles set about 3ft. off the ground (or 16in. above the highest plants in the paddock) and working at a pressure of 50lb. at the boom, to which the pressure gauge is fitted. He applies 1.3lb. acid equivalent of the ethyl ester of 2,4-D per acre in 35 gallons of water and is obtaining outstanding results. Good, but very much slower, kills are obtained from autumn and early winter sprayings.

The salts and amines of 2,4-D also give good control when used early in the season. The new formulations 2,4-DB and MCPB, which are of value for the control of seedlings and regrowth, were used experimentally near Tauranga last year. The former gave a control only slightly inferior to that given by the ester of 2,4-D, but the latter material failed to give effective control.

—A. V. ALLO

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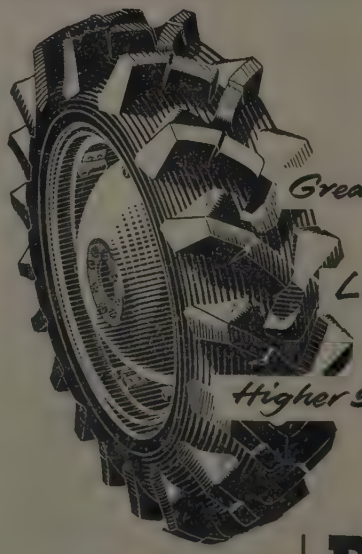

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Free Range Management of Growing Poultry Stock

THE practice of running pullets and cockerels on free range during their growing period is now accepted as sound management by commercial poultry producers. The essential points of management in this important phase of poultry farming are discussed in this article by F. C. Bobby, Superintendent, Poultry Industry, Department of Agriculture, Wellington.

MOST poultry farmers appreciate fully the importance of careful management in the brooder house for chickens during the first 6 weeks of rearing. Consequently it is with some feeling of relief that a poultry farmer removes the 6- to 7-week-old birds from the brooder houses for the second stage of rearing—their growing period, which extends until pullets are housed for the laying season. Hardened off from all necessity for heat and being ready for perching, these growing birds need far less close attention than was essential in the brooder house, but it is a bad mistake to overlook certain fundamental aspects of good management while pullets and cockerels mature into adult stock. Chickens well reared during the brooder stage can be easily spoilt during the growing stage by being reduced in constitutional vigour and thereby made more susceptible to disease.

Intensive or Extensive System?

The first point for consideration and decision is whether birds during their growing period shall be maintained under the intensive or extensive system. The vast majority of growing stock in this country is run on an extensive or free range system. This does not mean that growing birds cannot be managed under the intensive system successfully. However, the handling of birds under the intensive system probably calls for closer observation and more careful management than it does with free range. Kept intensively birds are more likely to become overcrowded as they grow. Overcrowding can lead so easily to dirty and damp litter, which in turn favours an outbreak of coccidiosis.

Trouble may also be experienced with feathering, more particularly with heavy breeds such as Rhode Island Reds and Australorps. Poor feathering and overcrowding are conducive to cannibalism and feather pecking. Furthermore, intensively kept birds must receive a nutritionally complete ration, as they depend entirely on the food supplied to them and have no opportunity to add to their diet as do birds on free range. However, pullets can do well under intensive conditions in good housing and under efficient management, but overcrowding and damp litter must be avoided.

Future breeding cockerels should be reared on free range during the growing stage. If they are kept intensively, there is a marked tendency for the combs to be "drawn up" and to become large and weak. Feathering can also be a problem. Apart from these management problems cockerels which have had access to good free range appear to develop into better bodied birds and to have that vigorous constitution so essential in breeding males.

Land for Growing Stock on Free Range

For satisfactory free range as much land as possible should be made available on a property for growing stock. Though land set aside for growing stock is used only for a part of the year, overstocking the area year after year can easily result in outbreaks of disease and a general deterioration in the quality of birds raised.

About 500 birds per acre is a reasonable figure to work to for growing birds and on land that is well drained and capable of maintaining a reasonable sole of grass this number can be run successfully year after year. Some poultry farmers try to run 800 to 1000 birds to the acre and in consequence too often meet trouble from disease.

Without doubt best free range conditions are obtained where the area of land available is large enough to permit of a change of ground from year to year, thereby allowing each area used to be grazed and rested for a year in between stocking with poultry. Dressing grassland used for free range with lime is also beneficial, as it prevents the soil becoming sour and improves the quality of the grass. It is doubtful, however, whether liming, even if quicklime is used, has any controlling effect on internal parasites such as coccidia and worms.

All too frequently commercial poultry farmers provide adequate and good free range for their growing pullets, but fail to give similar treatment to their cockerels. Cockerels are sometimes kept on a limited area, which becomes overcrowded and badly worn. This is obviously poor management when it is considered how important these male birds are during the breeding season. Like the pullets, they require the best conditions available and good management.

Housing on Free Range

Growing stock require comparatively simple housing, the main requisites being adequate perching space, dry conditions, and freedom from direct draught but with ample ventilation. A number of different types of free range growing stock houses or summer shelters have been devised. They include housing with solid sides and floors but open fronts, open sides and wire floors of the summer shelter type, or smaller units with solid sides and wooden slatted floors.

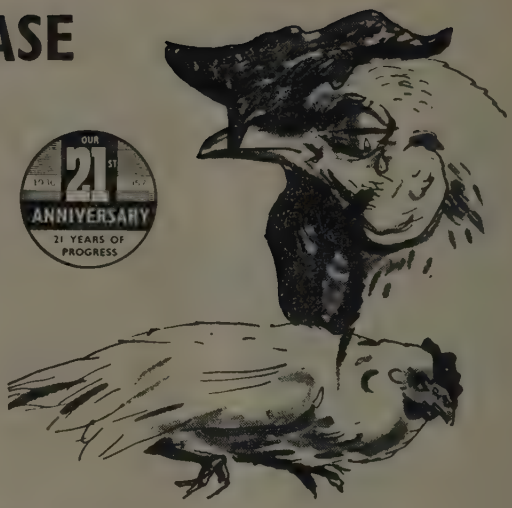
Perhaps the most common type is the summer shelter (Fig. 1) recom-

Fig. 1—The original design of summer shelter, with handles, roof of roofing felt, and fixed wire mesh floor.

NEW POULTRY DISEASE

PREVENTION IS *WISER* THAN CURE

Symptoms of a poultry disease new to New Zealand have recently been suspected in some areas. The Department of Agriculture has the matter in hand, but the suspected disease is highly contagious and with bad coughs and colds precautionary measures are desirable.



HOW TO KEEP OUT INFECTION

The simple rule is never to bring anything into your Farm that could have been contaminated in other runs. Keep to your own egg crates for example, and above all, avoid returnable food bags. 10d. rebate on a bag that contains food for 100 hens could mean the loss of from 5 to 60 birds—from £7/10/0 to £90/0/0 in cold cash.

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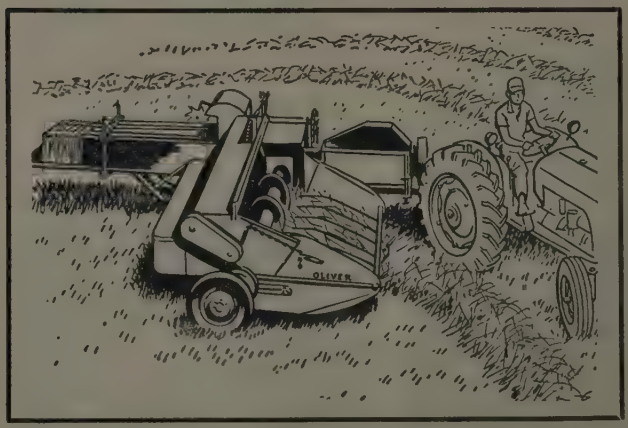

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F.W.S

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mended by the Department of Agriculture since about 1945. Poultry farmers have modified this type of shelter in a number of ways to suit their own particular conditions. This summer shelter has been used on the Department's Poultry Demonstration Plant at Upper Hutt since it was first introduced and has given satisfactory rearing for both growing pullets and cockerels. However, the years of experience with the original type of summer shelter have brought to light information of value.

The design of this house came originally from the United States of America. In that country and in the United Kingdom these houses are constructed of a comparatively light timber and consequently are fitted with long projecting handles at the front and back. These enable the house to be lifted and moved reasonably easily by two men. Built in rimu in New Zealand, this type of house was too heavy to be moved in this way and the handles were therefore dispensed with as useless.

The houses on the Departmental plant were built with wooden roofs and covered with a roofing felt, as at the time of construction of these original shelters corrugated iron was unavailable. A few houses were constructed with a roof of wire netting covered with sacking treated with tar containing pitch. Experience has proved that the wooden roofs covered with roofing felt are not entirely satisfactory, even when retreated at regular intervals with tar and sand. After some years the felting cracks or is fretted at the edges by wind and weather. Again this type of roof is likely to be damaged when the free range is grazed by cattle or sheep.

Fig. 3—The completed modified summer range shelter with metal roof.

Damage is also done, unless care is taken, when the houses are moved for cleaning purposes, that is, removing the droppings from under the floor.

The treated sacking lasted satisfactorily for about 3 to 4 years. Generally this type of covering for the roof is not recommended, though it is comparatively cheap and a method of reducing the total weight of the shelter.

A further drawback to the original design of the shelter was the fixed wire floor. To clean out the droppings when desirable or at the end of a season necessitated tipping the shelter up on one side or the lifting up of the house from off the accumulation of droppings. Being a heavy house this resulted in undue strain being placed on the framing unless care was taken. After some years this caused an undesirable and unnecessary deterioration of the shelter. Furthermore with a fixed wire floor it is not easy to clean the wire netting, which does accumulate some droppings.

As some of these shelters had to be replaced on the Plant, the Department has modified the design with a view to eliminating some of the weaknesses described. Figs. 2, 3, and 4 illustrate the new design now in use. The modifications in design, shown by a comparison of Figs. 2, 3, and 4 with Fig. 1, are as follows:—

1. The new shelter is raised up on wooden piles. This permits of a larger accumulation of droppings under the house and consequently less frequent clearing out. Previously droppings tended to accumulate until they reached the underside of the wire mesh floor. This can occur quite quickly as the birds reach near-maturity and the quantity of droppings passed becomes greatly increased.

2. Instead of a wooden roof with roofing felt, corrugated aluminium has been used, which will have far greater lasting qualities.

3. A chain link wire floor is used fixed on a metal framing. The floor is in two halves and both can be taken out for cleaning purposes when the centre board is removed. There is a door of sufficient size to allow of easy access to the inside of the house and when the wire is removed for cleaning out the droppings.

4. In the modified shelter metal uprights are fixed to the framework of the floor to carry the perches. This is seen clearly in Fig. 4. Previously wooden bearers at the ends of the house and a wooden central support

Fig. 2—The framework of the modified summer shelter. Wire netting around the piles prevents the birds from reaching the droppings.

Fig. 4—The interior of the modified summer shelter. The floor is of wire mesh with a board walk-way for access and to allow food troughs and water to be carried in when the birds are first put out on range. The perches are supported by metal uprights.

were used. This method provided cover for red mite, which can be troublesome in range houses if their control is neglected.

No difference has been made in the size of the house, which has a floor space of approximately 7ft. wide by 8ft. 6in. long.

Experience has shown that from 100 to 120 pullets can be housed at 6 to 8 weeks of age, but this number should be reduced to 80 a month before the birds are ready for moving to the laying houses. With cockerels the numbers should be restricted to 60 for heavy breed males and 70 for White Leghorns. These figures are maximum and should not be exceeded. Provided these houses are not overcrowded, the birds develop well, never suffer from colds, and seldom indulge in cannibalism.

Placing and Moving Shelters on Range

There are various opinions based on experience concerning how close these houses may be placed together. Some poultry farmers appear to meet trouble with birds migrating from one house to another, thus causing serious overcrowding. For others this problem does not seem to arise.

At the Department's Plant the free range for growing stock is split up into paddocks carrying from 4 to 6 of these shelters. This makes it possible to separate birds of markedly different ages as they are moved out from the brooder houses. Where possible pullets of all one colour are placed in a shelter, as for instance Australorps. White feathered crossbreds may be put in an adjacent house. In this case the birds rarely tend to migrate and mix.

As it is impracticable to move these shelters at regular short intervals, it has been found better to leave them in fixed positions with ample room for droppings to accumulate but with netting to prevent the birds reaching the droppings. There is of course a danger of getting worn ground around these houses, particularly toward the latter part of the season and during a wet summer. This has been countered in some instances by the placing of large round stones on the ground near the pop hole end of the house, where the greatest wear takes place. No serious trouble has been experienced from this disadvantage. At the end of a season the ground is cleared of all droppings and limed, both under the floor and around the shelter.

Moving Birds to Range

Care should be taken not to check 6-week-old stock when they are removed from the brooder house to range. Favourable weather should be chosen, rain or cold winds being avoided. It is usually advisable to place sacking or boards along one side and one end of the house to protect the young birds from the prevailing wind. This protection may be removed as soon as the birds are all perching every night. In cold weather it may help to place a thin layer of straw on the wire floor. By the time this has been scratched away through the wire netting the birds are on the perches at night.

Food and water should be easily available to the birds at the start, either near or even in the shelter if the weather is wet or cold. Birds in a brooder house have had full protection against the weather and food and water immediately to hand. An appreciable check is sustained where birds are moved to range and are expected to find their food in an exposed position. They limit their food consumption by facing the elements as little as possible. This drop in food consumption results in a check in growth, an important fact that is too often overlooked.

Control of Parasites

As the birds develop a sharp lookout should be kept for red mite. These external parasites can accumulate in numbers, particularly during hot weather. If overlooked, they will quickly debilitate the birds. Where trouble has been experienced with roundworms the use of one of the methods of deworming birds should be used. It is sound management to deworm birds at 12 weeks of age and again just as they are transferred to the laying houses.

Finally at the end of a rearing season rest the growing stock range until the next rearing season. Grazing with sheep is an excellent practice and assists in keeping range grassland fit for poultry year after year.

XVth International Horticultural Congress

The XVth International Horticultural Congress will be held in Nice, on the Cote d'Azur, from 11 to 18 April 1958 under the presidency of Mr. Henri Queuille, president of the National Horticultural Society of France, on the theme "Science in the Service of Horticultural Techniques".

The Congress will include discussions, meetings of the various sections, social functions, and excursions.

A great variety of accommodation will be offered in Nice. The reports and proceedings of the Congress will be published without delay and sent to active members and students.

The detailed programme will be sent to all who apply to the XVth International Horticultural Congress, 84 Rue de Grenelle, Paris VIIe, France.

Prevention of Disease in Bees and Brood

Seasonal Notes for the Domestic Beekeeper

BROOD rearing will now be well advanced in most districts. Before the season advances too far, however, the beekeeper should make himself familiar with the main diseases of the brood and the adult bee. In this article A. W. Bennett, Apiary Instructor, Department of Agriculture, Hamilton, describes how to detect these diseases, their symptoms, and the methods of treatment.

DRIFTING bees, robbing, and swarms from diseased hives are generally considered to be the main way in which bee diseases are spread. Other ways in which bee diseases can be spread are:—

1. Transferring combs from one hive to another without an occasional examination of the brood.

2. Hiving stray swarms direct on to bee combs.

3. Buying old empty hives or equipment.

4. Buying honey from an unknown source and feeding it to bees.

Hive Management

As robbing is the cause of most bee diseases, the beekeeper can do much to prevent this danger. Hives should be protected to prevent stock from tipping them over. All hive equipment, such as supers, lids, and floors should be of standard make and be "bee proof"; that is, they should be of good, even fitting with no holes or cracks through which a bee may gain admittance to the hive except at the main entrance.

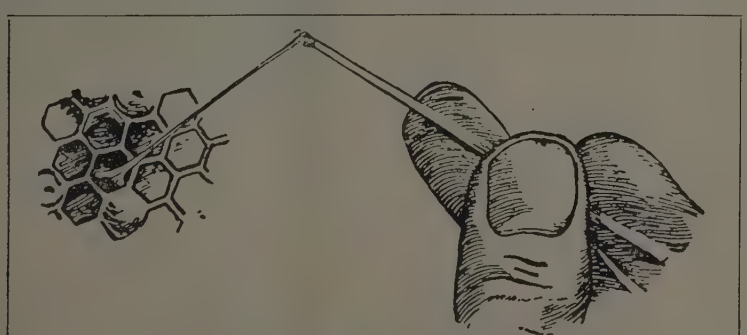
Only honey that is known to have come from a hive free of bee diseases should be used for feeding bees. Old combs and pieces of burr or brace comb should not be left lying about in the apiary, but should be put in a bee-proof container until they are required for melting down, or put direct into a solar wax extractor. Hive entrances should be only wide enough for the hive bees to keep complete control and repel any intruders.

Method of burning bees and hive contents affected with foul-brood.

Drifting can be reduced to a minimum by not placing the hives close together in straight rows. Trees or shrubs planted in the apiary are a great help as marks by which the field bees may get their bearings when returning to the hive; they also assist young bees returning after play flights.

Swarms from unknown sources should always be treated with suspicion and never put direct on to combs in a hive, but should be kept in a box with a few frames fitted with only small pieces of starter comb foundation for at least 4 days. This will cause them to use up in building comb all the honey they brought with them.

After 4 days they can be shaken from the frames and put in a hive with combs, or given frames fitted with full sheets of foundation. The frames fitted with starter comb foundation on which the bees have been working should then be completely destroyed by fire. After this the hive should be inspected at least every 10 days until the bees are well established and no brood diseases are evident.



Showing the ropy nature of American foul-brood.

American Foul-brood

American foul-brood usually shows up first by the capping of the cell being slightly darker than the sur-

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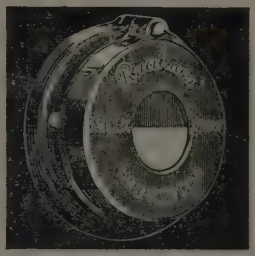

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rounding cells and having a greasy appearance. The capping will gradually flatten down or become slightly sunken, and later it may become perforated. This darkening and flattening down of the cell cap must not be taken as evidence of American foul-brood, as other brood diseases also produce this symptom to some extent.

The cap of the suspected cell should be removed with the end of a small stick of wood, and the stick should be inserted into the cell and given a twist in the dead matter and then slowly withdrawn. Should the dead matter adhere to the stick and rope out with it when being withdrawn, it is certain evidence of American foul-brood.

Where these symptoms are found the hive should be closed down immediately, and later that day, when all flying bees have returned, the contents of the hive including all bees and bee combs should be destroyed by fire and the remaining hive equipment thoroughly sterilised. All tools and the hands should be thoroughly washed in disinfectant immediately after the inspection and again after the destruction and burning of the hive, to prevent further spread of the trouble.

Sac-brood

The first sign of sac-brood is similar to that of American foul-brood. The cells have the same outward appearance, but the skin of the dead larva remains intact and contains a watery fluid, which does not rope out when probed as with American foul-brood. With care this skin and contents can be completely lifted from the cell without the skin being broken. They resemble a sac of liquid, and it is because of this that the disease gets its name, sac-brood. The colour of the dead matter ranges from greyish yellow to dark brown.

[*U.S. Department of Agriculture Bulletin No. 431*

End view of a cell containing a larva dead of sac-brood, with a cap which has the appearance of never having been completed.

In most cases sac-brood will disappear after the start of the main honey flow. Where the trouble is extensive, however, the diseased brood combs should be removed and destroyed by fire, the bees placed on fresh combs, and the remaining combs stored for 2 months, after which they may be again used.

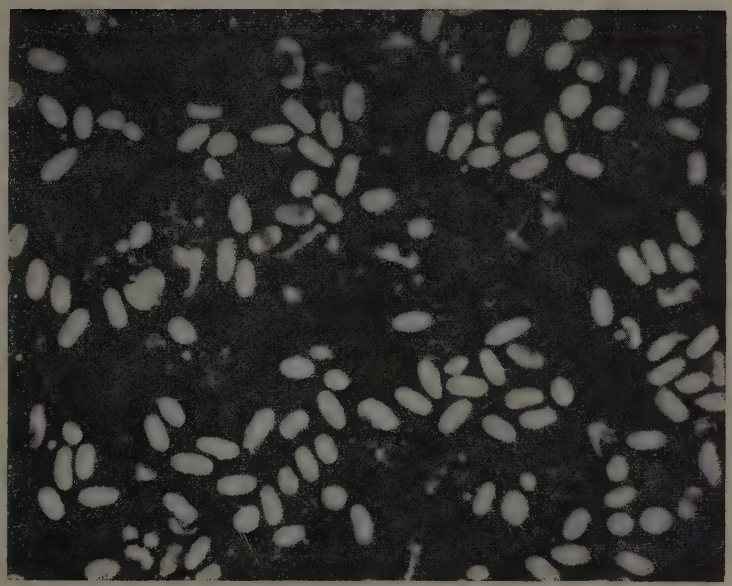
Requeening any such colonies with young, vigorous queens of Italian strain is also desirable. Sac-brood is generally more prevalent in the black or darker strain of bees.

Nosema apis

Nosema disease is caused by a small parasite which infects the lining of the bee's stomach. The trouble usually shows up during late winter and spring and is responsible for winter dysentery and spring dwindling of badly infected colonies.

Nosema disease is transmitted when healthy bees use food or stagnant water contaminated with nosema spores. The queen is also infected, and the trouble is spread by excreta from sick bees in and about the hive.

The first noticeable signs of *Nosema apis* shown by a heavily infected colony are increasing restlessness of the bees and serious dwindling of worker bees, many of which may be seen crawling on the ground in front of the hive. Some will make trembling movements with their wings and when dead are often found lying on their backs.



Spores of *Nosema apis* (enlarged 600 times).

Precautions and Treatment

All colonies should be kept strong in clean, dry, and well-ventilated hives, and clean running water should be available for the bees whenever possible, as stagnant pools or dishes of stale water near the hives are likely to become contaminated with nosema spores and transmit the disease when bees gather the water.

In mild cases no treatment is necessary as the start of the honey flow generally puts an end to the trouble. With more severe cases, however, it is advisable to requeen the colonies with young, vigorous queens as soon as possible, and where an isolated colony is badly infected and weak in bees it is advisable to destroy the contents of the hive, including the bees and combs, and to sterilise thoroughly all the remaining hive parts. The beekeeper's hands should also be thoroughly washed before other hives are inspected or opened up.

European Foul-brood

Though positive evidence has not been found to show that European foul-brood is present in New Zealand, beekeepers should be aware of its presence in other countries. It is a disease that appears to exist only in weak colonies or colonies that are very low in stores.

It usually attacks larvae 3 or 4 days old, but in bad cases will attack older larvae and even sealed brood. The young grubs when dead often remain quite white, but will have lost their plumpness and will lie in unnatural positions in the cells. As time goes on these grubs may change from white to dark brown. Any sealed brood that is dead may have perforated cappings as with American foul-brood, and if these are probed with a stick, only slight clinging or ropiness may result. The condition of dead, unsealed brood will d stinguish which disease is present.

Prevention is much better than cure. Good beekeeping usually takes care of this trouble. If all colonies are strong in bees and have a good supply of natural stores, it is very difficult for European foul-brood to get a start. Where European foul-brood is suspected the Apiary Instructor for the district should be consulted immediately for a reliable diagnosis and advice regarding treatment.

Acarine

Though acarine disease of adult bees has not been found in New Zealand, it is prevalent in some European countries, and in the British Isles is present in about a quarter of the colonies. The cause is a small parasitic mite, *Acarapis woodi*, which breeds in the trachea or breathing tubes of the bee. The mites feed on the body fluids of their victim, taking their food from the trachea walls. The female mites lay their eggs and the young are hatched and reared within the trachea of their host. When the trachea become crowded the mites crawl out and search for a new host.

The disease is also transmitted by drifting of infested workers from diseased to healthy colonies and by robber bees. Heavily infested bees become weak, are unable to fly, and soon die, a condition that rapidly overtakes the whole colony.

The first sign of acarine is a number of bees running about in front of the hive, some with the hind wings sticking out sideways while the forewings are folded in the usual position. This occurs usually in early spring, though it may occur at any time during the season. As the disease advances numbers of bees will be found dead in front of the hive, and large numbers will also be seen crawling in front some distance from the hive. The whole apiary will quickly become infested.

Though the importation of bees into New Zealand is governed by a strict quarantine system requiring the importer to obtain a permit under the Apiaries Regulations 1952, and no permit is granted for importation from those countries where acarine is known to exist, there is always the possibility of an illegal importation of bees either by accident, or by ignorance, or by wilful disregard of the regulations.

Any case with the described symptoms, including mass crawling of bees, many with unjointed wings, should be reported immediately to the Apiary Instructor for the district for investigation, as acarine is the most devastating of all bee diseases.

Meteorological Records for August

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in Inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	53.8	+ 2.8	69.8	37.5	13.33	21	+ 6.50	2.47	31	123
Auckland	160	53.6	+ 1.4	65.5	40.5	3.77	17	— 0.65	0.72	25	144
Tauranga	10	52.0	+ 2.3	65.3	31.5	8.80	21	+ 4.05	1.82	31	114
Ruakura	131	50.4	+ 2.6	65 8	28.2	3.22	20	— 0.87	0.99	21	123
Whakarewarewa ..	1006	48.6	+ 3.1	62.9	28.4	4.22	16	— 0.88	0.78	21	110
Gisborne ..	12	50.8	+ 1.6	67.4	35.5	7.22	22	+ 3.36	0.95	31	119
New Plymouth ..	160	52.1	+ 2.5	63.8	34.2	3.57	13	— 2.18	1.04	14	134
Kariol	2125	44.2	+ 2.2	61.6	26.0	2.16	10	— 2.65	0.49	21	
Napier	5	50 0	+ 0.9	64.4	33.4	2.84	17	— 0.09	0.69	25	131
Wanganui	72	50.2	+ 1.1	66.8	30.8	1.83	12	— 1.12	0.59	16	141
Palmerston North ..	110	50.2	+ 2.5	62.8	30.0	1.18	13	— 2.57	0.43	21	120
Waingawa	340	4b 2	+ 2.3	63.5	29.7	1.96	17	— 2.22	0.85	31	112
Wellington	415	49.b	+ 2.2	64.3	37.2	2.97	12	— 1.68	1.56	21	138
Nelson airfield ..	5	47.6	+ 2.8	62.0	25.8	2.07	10	— 1.07	0.94	11	164
Blenheim	12	48.5	+ 2.2	67.0	28.2	1.43	7	— 0.90	0.73	9	157
Hokitika	15	47.5	+ 2.8	64.8	27.8	6.89	16	— 2 15	1.62	11	159
Hanmer	1270	42.4	+ 1.0	63.0	12.0	3.03	9	— 0.55	1.23	15	134
Christchurch ..	22	46.6	+ 2.3	66.3	23.9	0.51	8	— 1.54	0.19	16	138
Ashburton	323	45.2	+ 1.5	68.0	18.0	0.67	7	— 1.65	0.20	16, XI	131
Timaru	56	44.4	+ 0.6	66.8	24.4	0.85	12	— 0.61	0.27	15	134
Alexandra	520	40.7	— 0.7	66.0	16.9	0.21	4	— 0.42	0.09	20	150
Taieri	80	43.1	— 0.6	64.4	20.5	0.43	5	— 1.31	0.17	15	123
Invercargill airfield ..	0	43.3	+ 0.3	60.7	20.8	1.49	15	— 1.45	0.54	20	135
Chatham Islands ..	140	46.7	+ 0.5	56.7	35.2	1.34	19	— 1.83	0.33	14	

Commercial Glasshouse Production

THERE were 1198 commercial growers of glasshouse tomatoes in the 1956-57 season according to statistics by the Horticulture Division of the Department of Agriculture. The total area of commercial glasshouse tomato production was 7,066,500 sq. ft.; of grapes, 613,900 sq. ft.; and of cucumbers, 302,300 sq. ft.

The greatest commercial glasshouse production of tomatoes was in the Auckland district, 1,947,700 sq. ft. Canterbury was next with 1,805,200 sq. ft., and Nelson, Wellington, and Hawke's Bay followed with 1,174,700 sq. ft., 393,300 sq. ft., and 377,000 sq. ft. respectively.

Auckland district headed the list of areas growing grapes under glass with 386,500 sq. ft. and Canterbury was next with 81,400 sq. ft.

The commercial growing of cucumbers under glass was heaviest in Northland, 193,000 sq. ft., and in the Auckland district, 73,900 sq. ft.

Government Approved Turnip and Swede Seed

THE usual practice of making into a single blend the seed of each variety of Government Approved turnip and swede seed for distribution throughout New Zealand has again been followed in 1957. Government Approved seed is packeted in appropriately labelled 1lb. and 2lb. calico bags, sewn with a lock-stitching machine.

The variety N.Z. Victory Yellow has been withdrawn from distribution, as the very small inquiry received for seed does not justify maintenance of supplies, particularly as N.Z. Champion Hybrid is proving a satisfactory alternative.

The germination of all varieties of Government Approved turnip and swede seed being distributed in 1957 is over 90 per cent. If seed from the 1956 distribution is still available, samples should be subjected to fresh germination test before sale.

Sheep-carrying Capacity Trial at Winchmore Irrigation Research Station

By G. K. McPHERSON,

Irrigation Research Officer, Department of Agriculture Irrigation Research Station, Winchmore

DURING 1949 a trial was established at the Department of Agriculture's Winchmore Irrigation Research Station to determine the potential fat lamb production from irrigated pastures. The trial to date has aimed at maximum ewe-carrying capacity with supplementary winter feeding from winter-saved grass and hay. In the October 1953 issue of the "Journal" the carrying capacity and lamb and wool production from 1949 to the end of the 1952-53 season were described and in this article the experiences of the following 4 seasons from 1953-54 to 1956-57 are discussed.

THE trial area of 27 acres was sown down in three 9-acre fields in March 1949. Further subdivision was subsequently carried out and now there are eight fields of about 2¼ acres each and three fields of 3 acres.

Intensively managed pastures have provided the feed for ewes and lambs. Each year about 15 acres have been closed in rotation from late February to the end of March, irrigated, and held for rationed winter and early spring feeding. Hay has been saved and used for winter feeding.

During the 4 years under review, the trial has been conducted along similar lines to previous years. It has remained an "all-grass" farm; it has been irrigated for optimum growth, and the policy of wintering the ewes on winter-saved grass plus hay has continued.

Stock Numbers

Stock numbers have remained at 7 breeding ewes per acre throughout the 4 seasons. Any deaths occurring during the year have been replaced to maintain the number of ewes on the trial at 7 per acre.

Each season a fifth of the flock has been culled some time in February and these have been replaced with 2-tooth ewes. Replacements have consisted mainly of Romney cross ewes. All rams used have been of the Southdown breed.

HEADING PHOTOGRAPH: Sheep strip grazing autumn-saved pasture on the fat lamb production trial area at the Winchmore Irrigation Research Station.

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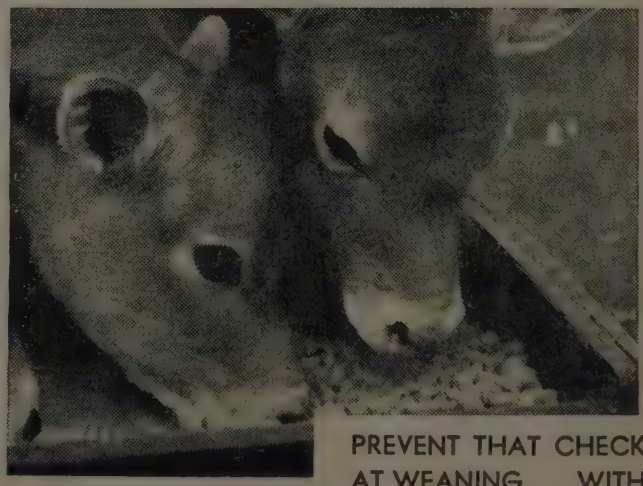

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In Table 1 are given lambing percentages, percentages of ewe deaths, lamb deaths, and dry ewes for the 4 seasons 1953-54 to 1956-57 inclusive.

TABLE 1

Season	Lambing	Percentage Ewe deaths	Lamb deaths	Dry ewes
1953-54 ..	115	3.1	2.1	4.2
1954-55 ..	116	4.2	2.1	7.2
1955-56 ..	122	2.6	1.6	2.6
1956-57 ..	122	1.5	2.1	2.1

One of the features of the trial has been the relatively low death-rate of ewes and lambs under very heavy stocking. The fact that the area is run as a trial, with possibly a much higher standard of management of the stock than would be obtained under practical farm conditions, is perhaps the main reason for the low death-rate.

As a precautionary measure all the ewe flock was drenched in the spring of 1953 and 1954. In the spring of 1955 half of the ewe flock was drenched and in the spring of 1956 the ewes were not drenched. It has been customary to drench the lambs two or three times during the season, but no lambs were drenched in the 1956-57 season.

Pastures

Originally sown in the autumn of 1949 with a mixture of perennial ryegrass, short-rotation ryegrass, cocksfoot, crested dogstail, and red and white clover, the pastures over the last 3 or 4 years have been mainly perennial ryegrass-white clover dominant, with some crested dogstail and cocksfoot. Both goosegrass and browntop have appeared in the sward, indicating that some degeneration of the pastures has occurred, though the stocking rate has not been affected.

In an endeavour to maintain the pastures in a good thriving condition, or even improve them, several paddocks have been oversown, "Blackmore" tips being used. To date 15 acres have been treated in this way, the mixture generally used per acre being 10lb. of short-rotation ryegrass, 4lb. of cocksfoot, and 3lb. of Montgomery red clover. There is little evidence of the Montgomery red clover from the oversowing, but both short-rotation ryegrass and cocksfoot appear to be contributing an appreciable amount to the sward.

After 8 years the pastures are generally in good order and appear to have several years of useful life ahead of them yet.

Topdressing

Before sowing of the grass mixture in the autumn of 1949 2 tons of lime per acre was sown on the cultivated ground. Since then approximately half of the area has received a further 1 ton of lime. Topdressing of the area has been at the rate of 2cwt. of superphosphate per acre per year, this being increased to 3cwt. per acre per year in two applications.

Probably 1½cwt. of superphosphate per acre per year is the more economic dressing on the average farm. However, under the very efficient utilisation of the growth in this trial the heavier application may be justified. Small quantities of nitrogenous fertiliser have been applied, but results have not been encouraging and applications have been discontinued.

Hay

The policy on the trial area is to winter the ewes on winter-saved grass plus hay. No crops are grown.

The amount of hay made yearly averages 350 bales. Weights taken at odd times have shown the bales to weigh between 60lb. and 70lb. each.

The method generally has been to shut up a paddock in spring to be cut for hay in either November or December. This paddock provides approximately half the hay required. As the lambs are drafted during December-January, further areas are shut up and the balance of the hay is made in February or March.

Hay made in November-December averages about 60 bales per acre and that made in February-March about 30 bales per acre.

Irrigation

There has been no restriction on the amount of water used for the irrigation of this trial. In this respect it differs from farms in that no roster system of the supply of water is observed. When a paddock required irrigating water was applied. Under these conditions it is probable that maximum pasture production was approached.

The number of irrigations applied varied with the season. In 1956-57, an extremely wet season, only 3 to 4 irrigations were necessary. On the other hand in the 1955-56 season, when there were an extremely dry spring and summer, the lowest number of irrigations applied to any one paddock was 10 and the highest number was 14.

Perhaps more important than the total quantity of water applied was the fact that sufficient water was available at "pinch" dry periods to maintain maximum growth for that period.

There is no doubt that optimum irrigation has been the key to the success of the trial. A reduced water supply or inability to apply the water at the right time would naturally have led to a reduction in the number of stock that could be carried.

Production

Table 2 gives details of lamb and wool production.

The per acre yields of both lamb and wool are high. However, this production has been obtained under experimental conditions, with no restrictions on the quantity of water used for irrigating.

Perhaps the main features learnt from the trial are:—

1. The relative freedom from disease of the ewes under very heavy stocking conditions. No serious case of ill health has so far occurred among the ewes.

2. The success of autumn-saved grass for wintering the ewes. Given 1 to 2 hours per day on saved grass, the ewes have invariably come through the winter in good order and at lambing time a minimum of sleepy sickness has occurred.

3. The value of grass and clover hay. The ewes have had only this type of hay fed to them during the winter and though some of it has been baled under adverse weather, the ewes appeared to have thrived on it.

4. The value of perennial ryegrass and white clover in a pasture mixture. In this trial these two species have survived the close and continuous grazing which the trial area has been subjected to off and on over the past 8 or 9 years.

5. The weakening of sward species such as cocksfoot, Montgomery red clover, and short-rotation ryegrass after 3 or 4 years, even where the soil fertility has been built up with heavy stocking.

The experience of both stock and pasture management obtained from this trial is to be used shortly in a similar trial on the Station extending over approximately 150 acres. Irrigation for this larger trial will be restricted to 1 cusec of water per 100 acres.

TABLE 2—LAMB AND WOOL PRODUCTION

Season	Number lambs sold	Percentage lambs fat off mothers	Average weight lambs lb.	Percentage seconds lambs	Wool weight per ewe lb.	Months' growth wool
1953-54 ..	213	22	32.0	12	8.9	11
1954-55 ..	215	33	32.5	17	10.4	12
1955-56 ..	228	48	31.0	13	10.2	12
1956-57 ..	230	62	31.4	7	12.3	13

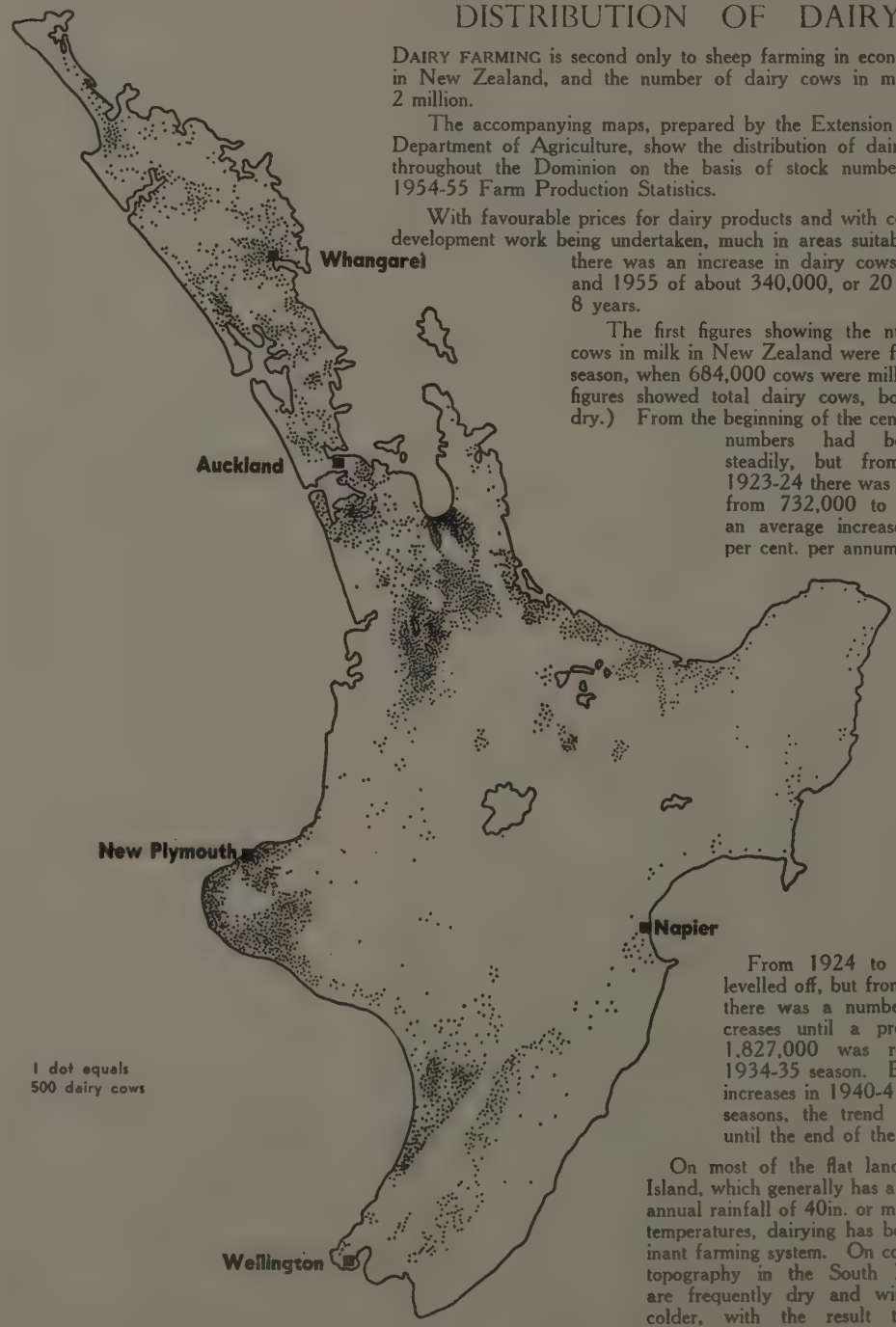
DISTRIBUTION OF DAIRY COWS

DAIRY FARMING is second only to sheep farming in economic importance in New Zealand, and the number of dairy cows in milk is now over 2 million.

The accompanying maps, prepared by the Extension Division of the Department of Agriculture, show the distribution of dairy cows in milk throughout the Dominion on the basis of stock numbers given in the 1954-55 Farm Production Statistics.

With favourable prices for dairy products and with considerable land development work being undertaken, much in areas suitable for dairying, there was an increase in dairy cows between 1947 and 1955 of about 340,000, or 20 per cent. in the 8 years.

The first figures showing the number of dairy cows in milk in New Zealand were for the 1916-17 season, when 684,000 cows were milked. (Previous figures showed total dairy cows, both milking and dry.) From the beginning of the century to this time numbers had been increasing steadily, but from 1918-19 to 1923-24 there was a sharp increase from 732,000 to 1,185,000, or an average increase of about 12 per cent. per annum.



From 1924 to 1928 numbers levelled off, but from the latter year there was a number of sharp increases until a pre-war peak of 1,827,000 was reached in the 1934-35 season. Except for slight increases in 1940-41 and 1944-45 seasons, the trend was downward until the end of the war.

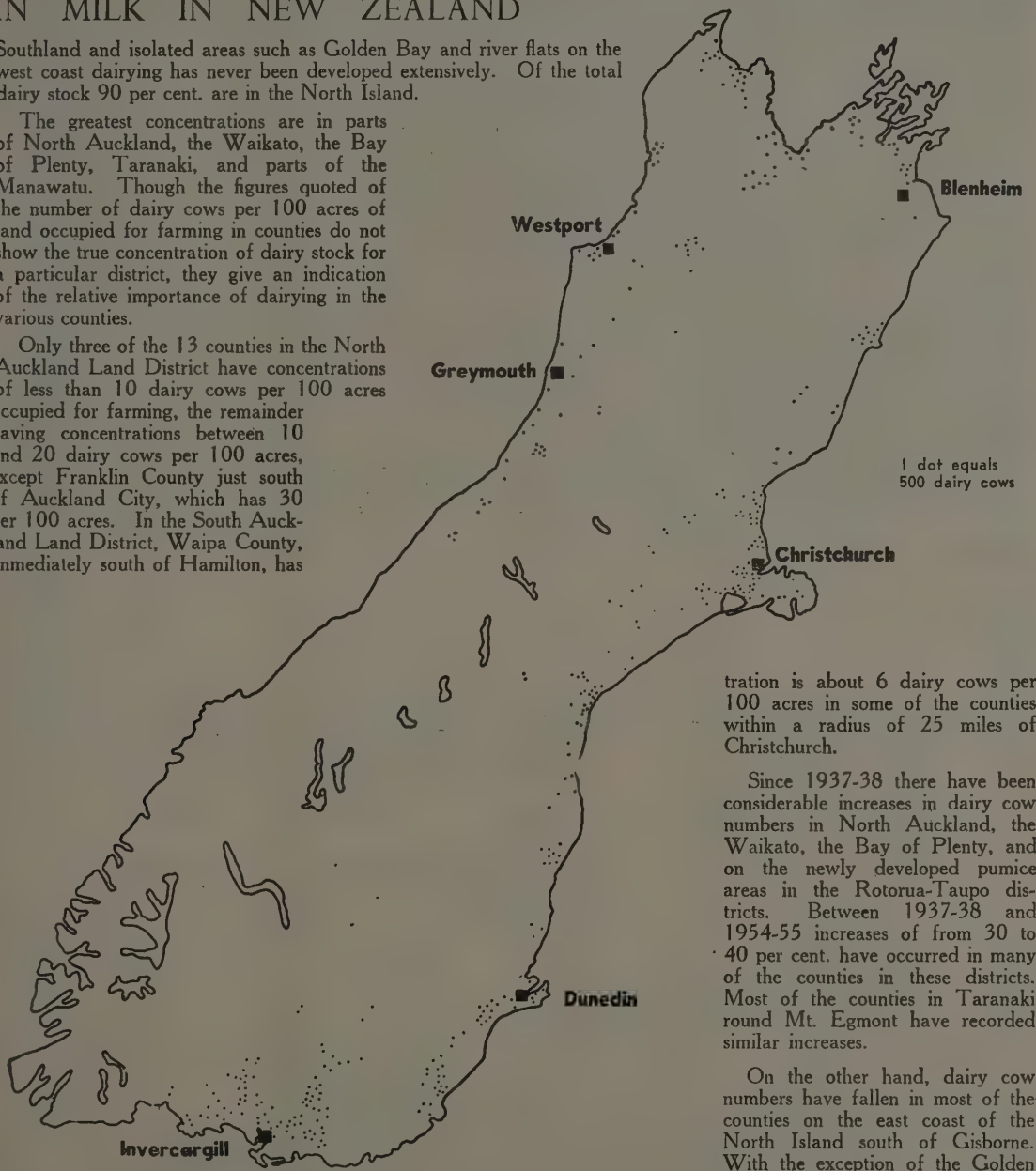
On most of the flat land of the North Island, which generally has a well-distributed annual rainfall of 40in. or more and equable temperatures, dairying has become the dominant farming system. On country of similar topography in the South Island summers are frequently dry and winters are much colder, with the result that except in

IN MILK IN NEW ZEALAND

Southland and isolated areas such as Golden Bay and river flats on the west coast dairying has never been developed extensively. Of the total dairy stock 90 per cent. are in the North Island.

The greatest concentrations are in parts of North Auckland, the Waikato, the Bay of Plenty, Taranaki, and parts of the Manawatu. Though the figures quoted of the number of dairy cows per 100 acres of land occupied for farming in counties do not show the true concentration of dairy stock for a particular district, they give an indication of the relative importance of dairying in the various counties.

Only three of the 13 counties in the North Auckland Land District have concentrations of less than 10 dairy cows per 100 acres occupied for farming, the remainder having concentrations between 10 and 20 dairy cows per 100 acres, except Franklin County just south of Auckland City, which has 30 per 100 acres. In the South Auckland Land District, Waipa County, immediately south of Hamilton, has 36 per 100 acres and Hauraki Plains and Piako Counties 46 per 100 acres. In the Taranaki Land District the highest concentration of dairy cows is in Waimate West County, a short distance west of Hawera, where the concentration is a little over 50 per 100 acres.



These figures are in sharp contrast with those for the South Island, where the highest concentration is about 6 dairy cows per 100 acres in some of the counties within a radius of 25 miles of Christchurch.

Since 1937-38 there have been considerable increases in dairy cow numbers in North Auckland, the Waikato, the Bay of Plenty, and on the newly developed pumice areas in the Rotorua-Taupo districts. Between 1937-38 and 1954-55 increases of from 30 to 40 per cent. have occurred in many of the counties in these districts. Most of the counties in Taranaki round Mt. Egmont have recorded similar increases.

On the other hand, dairy cow numbers have fallen in most of the counties on the east coast of the North Island south of Gisborne. With the exception of the Golden Bay and Murchison districts and the area round Christchurch, all South Island counties have shown a decrease, the most marked being that of between 35 and 40 per cent. since 1937-38 in Southland counties.

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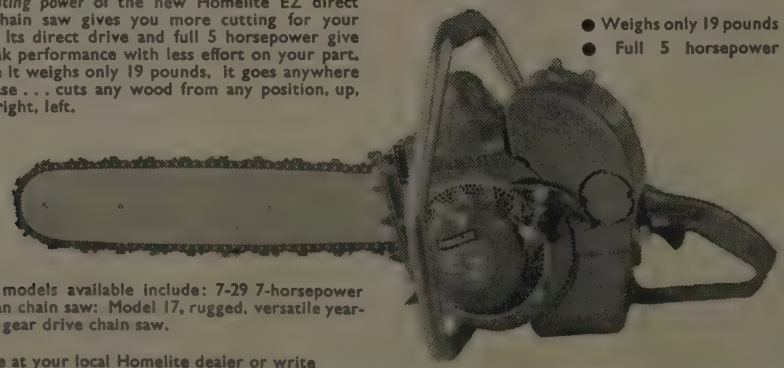

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WORK IN THE HOME GARDEN IN NOVEMBER

By A. G. KENNELLY,
Horticultural Instructor, Department of Agriculture, Dunedin

NOVEMBER is usually a busy month in the home garden. Where soil conditions are good the home gardener usually has the satisfaction of seeing his crops respond with vigorous growth to the higher temperatures usual during the month. Most gardens are well planted up by November. Asparagus, broad beans, lettuce, peas, radishes, rhubarb, turnips, silver beet, spinach, spring onions, cauliflower, and spring cabbage are available in many good gardens, but there is usually still plenty of work to be done.

THE ground should be kept weed free and thinning done in good time. Seed of winter greens such as savoy cabbage, broccoli (winter cauliflower), and curly kale can still be sown, but no time should be lost in most districts. Only in the most favoured northern districts is sowing later than November recommended. In most southern districts a first sowing of swedes can be made and, where conditions are not likely to be too hot and dry, peas can be sown.

Successional sowings of salad crops such as lettuce, radishes, spring onions, and turnips and the planting out of cabbage, cauliflower, and lettuce to mature in late summer and autumn should be attended to. Support should be provided where necessary for crops such as tomatoes and climbing beans. Beds can be prepared for a planting of celery, earlier planted potatoes can be earthed up where there is risk of infestation from larvae of the tuber moth or greening of the tubers, and the planting of the main crop can be completed.

The sowing or planting of frost-tender subjects such as French or runner beans, cucumbers, marrows, pumpkins, squash, tomatoes, sweet corn, and, in favourable districts, kumaras can be proceeded with except in parts of Canterbury and some southern districts where there is danger of frost until the second week in the month.

Control of Pests

Many home gardeners tend to regard spraying as the sole means of combating insect pests, but this is not so. Good husbandry, in which crop hygiene, rotation, and early removal of diseased plants are practised, is not less important. Crop hygiene means that all infested rubbish should be burnt or buried deeply after a crop has been harvested. Plants should not be set too closely because the dense growth which results from close planting usually provides good shelter for insects and makes it difficult to reach them with sprays. Crop rotation is most important from the point of view of root diseases, and where eelworm is troublesome. If crops little affected by eelworm can be rotated with cover crops of barley or oats, the eelworm population will be reduced. It is preferable to grass down for several years but, even if ground is in a cereal for one season, infestation will be greatly reduced. Grasses and cereals are resistant to eelworms and asparagus, onions, cabbage, cauliflower, celery, sweet corn, parsnips, carrots, radishes, rhubarb, spinach, and turnips though attacked, are not affected much by them.

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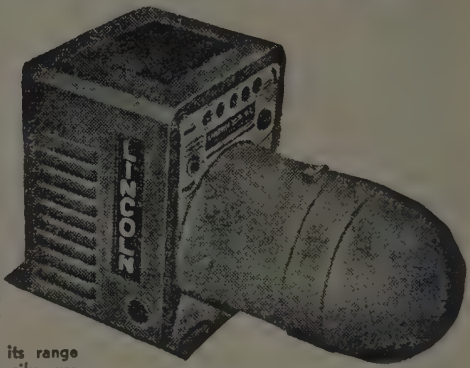

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The advantages of removing infected plants are most apparent in the control of plant diseases, but where an odd plant in a crop is sickly and infested with pests such as red spider or aphids, such plants should be removed and destroyed. Regular cultivation discourages soil-inhabiting pests, including grass-grubs and cut-worms, and destroys alternative weed hosts, from which a build-up of pests often arises.

Asparagus

The period during which asparagus can be cut varies greatly according to the bed and may range from 6 to 10 weeks. Research has shown the harm likely to be done to young beds by too early cutting. Only if the growing season is long and the plants well established should a cutting (of not more than 2 weeks) be made the third year from time of planting the seed or the second after setting out plants. In the fourth year the cutting period should not exceed about half the season or about 4 weeks. Thereafter cutting can continue each year for from 6 to 10 weeks according to season of growth and vigour of the bed.

Beans

Beans are one of the most important vegetables and many kinds and varieties are available. All varieties, except broad beans are frost-tender and require comparatively warm conditions for germination and growth. In districts not subject to late frosts an early sowing of either dwarf or climbing beans can be made from early October, according to the district, though in most districts the end of October or early November is preferred.

Successional sowings can be made as needed until about the end of January in most districts. Whether runner, climbing, or dwarf beans are grown usually depends on the space available. Climbing beans, if well grown, yield more heavily and over a longer period than dwarf, and the stringless climbing varieties are not inferior in flavour and quality to the best dwarf varieties.

French Beans

Varieties of French or kidney beans (*Phaseolus vulgaris*), which are most commonly grown, can be divided into two groups, climbing and dwarf, which in turn can be divided into tough podded (the pods of which may be tough and leathery when fully ripe) and edible podded (the pods of which are tender and do not usually become very stringy).

The climbing varieties of French beans are annuals like the dwarfs and differ from the runner bean (*Phaseolus multiflorus*), which is a perennial.

Runner Beans

Runner beans are not hardier than most varieties of French or kidney beans, but the flowers usually set and develop pods with more certainty where conditions are less favourable than many other varieties of tender bean. They are therefore largely grown in the cooler parts of the South Island.

Scarlet Runner is the best-known variety of runner bean, but improved strains such as Emperor Scarlet Runner, Princeps, Prizewinner, and Streamline are capable of yielding heavy crops of fine-quality beans which, if picked when young from plants that have been grown in favourable conditions, are not inferior to the best-quality French beans. As the runner bean is a perennial, one advantage of growing it is that the roots, which are conspicuously thickened, can be left in the ground during winter in most gardens and the vines will usually yield pods earlier than those from seed sown in spring.

Butter Beans

Butter or waxpod beans are stringless varieties of French beans with pale or golden pods. There are tall and dwarf varieties of butter and waxpod, and they should be planted a little later than the ordinary French beans. Good varieties include Pencil Podded Wax and Round Pod Kidney Wax (round-podded varieties) and Woods Centenary (butter) and Surecrop Black Wax (flat podded).

[*Green and Hahn*

Both dwarf and climbing beans usually grow well in November.

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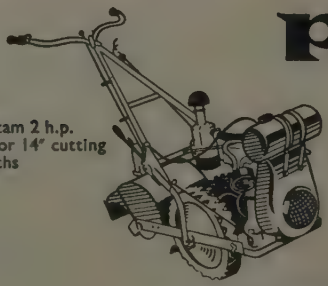

Bantam 2 h.p.
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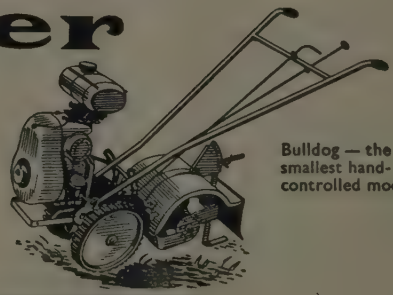

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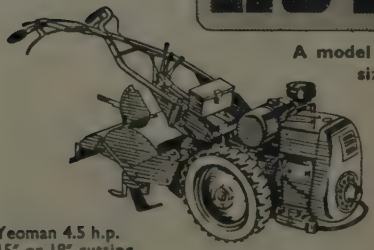
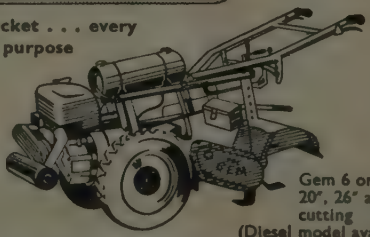


Yeoman 4.5 h.p.
15" or 18" cutting width



Gem 6 or 9 h.p.
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versatility

Thick, fleshy-shelled beans are also known as snap beans, because the pods snap cleanly when bent far enough. Beans are also classed as green shell and dry shell. Green-shell varieties are flat podded and are generally shelled and eaten like mature broad beans, though the pods of many varieties can be eaten when young like those of snap beans. Dry-shell beans are grown and used after the seed is mature or dry.

Though in France the term haricot is given to all types of beans except broad beans, in New Zealand it is applied to certain types of dwarf and climbing beans grown for their dry seed. Seed of Black Valentine (Black Prince) is sometimes used as haricot beans.

Varieties

Good dwarf varieties of beans include the following:—

Black Valentine, which is heavy bearing with dark green stringless pods about 7in. long. It is often used for second early or main crop.

Masterpiece crops well with straight, stringless pods for early main crop or a late sowing.

Pale Dun is hardier than most varieties and where frosts are not severe it can be sown earlier. It crops heavily with medium length, flat, fleshy pods which develop some stringiness as they reach full size. This variety is not always stocked by seedsmen.

Tendergreen crops well and has tender, dark green, straight, fleshy, round, 6in. pods.

The Prince and **Topcrop** are other popular varieties.

Good climbing varieties of beans include the following:—

Fardenlosa, which is largely grown commercially because it crops heavily with straight, tender, fleshy, stringless beans up to about 10in. long.

Blue Lake is a good bean to grow for bottling or freezing.

Westralia is a useful variety somewhat similar to Fardenlosa in cropping. As it appears to be highly resistant to bean rust, it should be especially valuable, particularly in autumn, in districts where that disease is troublesome.

A number of other useful varieties of dwarf and climbing beans are listed in most seedsmen's catalogues.

Beans are very susceptible to low temperatures, as well as frost, and can be grown outside successfully only during the warm period of the year. Cold weather or extreme changes in temperature adversely affect pollination of the flowers. Dryness at the roots is also a frequent cause of non-setting of the flowers and it is partly for this reason that sandy soils or soils containing very little humus should be avoided for main crops unless a supply of moisture can be assured. A cold snap or exceptionally hot and dry conditions during the development of the young pods may cause them to curl or hook or even to wither and die.

Soil Preparation and Sowing

The soil for beans should be well drained and cultivated before sowing. It need not be more than moderately rich in organic material and nitrogen and potash, but the addition of phosphates or complete fertilisers rich in phosphates has been found beneficial on many soils where trials have been carried out. Beans are tolerant of moderately acid conditions, but lime should be applied at at least 3oz. a square yard some time before sowing if the land has not been dressed with lime recently.

Climbing beans can be grown in rows without staking by slashing or pinching back excessively long growths, but where growing conditions are favourable best results are obtained if vines are staked or allowed to climb a support. Though it is advisable in most districts to make more than one sowing of dwarf beans if continuity of supply is to be assured, most varieties of climbers will continue to bear until cut down by frost if the pods are picked regularly and are not allowed to develop fully. Dwarf beans have the advantage of developing pods earlier, taking about 7 to 9 weeks, compared with about 9 to 10 weeks for most climbing varieties.

Bean seed should be sown 1in. to 2in. deep, but in exposed positions or on soils that tend to dry out a drill 2in. to 3in. deep should first be drawn out and the seed pressed 1in. to 2in. deep (according to whether the soil is heavy or light) in the bottom of it. Dwarf beans can be sown in single rows or double rows 6in. apart, with 2ft. between the rows. Seed should be sown or seedlings thinned to 2in. to 4in. apart; the richer the soil is the greater the distance between plants should be. Runner or climbing beans are usually sown or thinned to 6in. to 8in. apart in double rows about 9in. apart and 3ft. to 4ft. from other vegetables.

Cucumbers

Cucumbers are popular for summer meals. They are easily grown if a warm, sunny spot is available, but are frost tender. An early start can be made by sowing them on a hot-bed or under glass so that the plants can be set out in their permanent positions as soon as frost danger is past.

The seedlings, like those of other cucurbits (marrows, pumpkins, and melons) and sweet corn, do not transplant well. If plants are intended for transplanting, seed should preferably be sown in pots or paper packages; if seed is sown in a box or in the soil of a frame, plants should be lifted carefully with a quantity of surrounding soil before they are too large.

Though cucumbers are grown outdoors commercially in some southern districts, the season must be reasonably good for the crop to succeed. However, in sunny situations in home gardens where shelter is available and a miniature hot-bed can be made at each hill, success can be assured. Ground in the open must be fairly warm before seed is sown.

Where transplanting is to be done seed should be sown 3 to 4 weeks before the proposed time of planting out. Temperatures for cucumbers should be higher than is necessary for a number of similarly treated subjects. The soil should not be allowed to dry out, but

[*Sparrow*

Cucurbits, such as marrows (above), cucumbers, melons, and pumpkins need warmth for growth.

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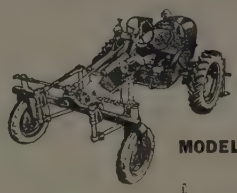

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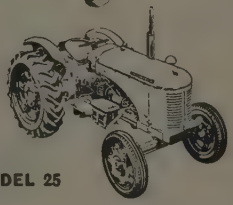

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over-watering should be avoided. If planting out is to be done immediately after the date of the last killing frost, plants should be hardened off by gradual exposure to the cooler conditions of the open air a few days before being set out.

Method of Improving Conditions

If conditions in the open are not as warm as desired, good results can be obtained by taking out about a cubic foot of soil in a warm, sunny, sheltered part of the garden and filling the hole with fermenting manure to within about 3in. to 4in. of the ground surface; the final 3in. to 4in. should be filled with soil in which (or preferably at the sides of which) several seeds or plants are set. More seeds than the number of plants required are usually sown to offset poor germination. To facilitate watering, the ground surface should be level when sowing is completed.

Seed should be sown ½in. to 1in. deep according to whether the soil is wet and heavy or dry and light or sandy.

Plants can be spaced 18in. apart in rows 4ft. apart, but if the hill system is used and growing conditions are favourable, spacing of the hills should be more liberal, though 3 or 4 plants can be grouped round the edge of each.

Good varieties include Apple, Crystal Apple, White Spine, Moneymaker, Marketer, Long Prickly, Stockwood Ridge, and Straight 8.

[*Sparrow*

Kumaras or sweet potatoes are mainly grown in northern parts of New Zealand. They need a long growing season with mild day and night temperatures.

Egg Plant

The egg plant is a native of the tropics and is much used in parts of India, where it is called bringal and is eaten in curries or roasted in red-hot ashes and mashed with salt, lime juice, onions, and peppers. In France it is called aubergine. There are a wide range of varieties with fruits of several colours—purple, white, ash coloured, green, and brownish. In shape the fruits vary from elongated to round. At present the only one of interest in New Zealand is the purple-fruited type.

A warm-weather plant, the egg plant requires a long growing season (about 5 months) with high average day and night temperatures. Egg plants grow well in a wide range of warm, fertile, well-drained soils. An abundance of plant nutrients and organic material is desirable, as the plant is a heavy feeder and responds to liberal manuring.

The plants should be raised under glass. As they are rather sensitive to transplanting, special care in raising is necessary and the use of plant containers (earthenware or paper pots) is advisable. Plants should be set out 24in. apart in rows 3ft. apart, and November is considered the most favourable time for planting. In most localities where the season is short the fruits should be thinned to 4 or 6 to each plant. As the fruit becomes dry and tough if overmature, it should be harvested as soon as it has attained a full purple colour. About half a dozen plants should meet the requirements of the average family.

Good varieties include Black Beauty, Early Long Purple, and New York Improved.

Kumaras

Kumaras or sweet potatoes are usually propagated by rooted shoots or slips, which can be purchased from seedsmen, usually from about mid-October onward in areas suited to kumara culture.

Soil Conditions

The soil for kumaras should be of a type that warms readily, and light or sandy loams are usually preferred. Organic manure applied to a previous crop gives most satisfactory results, and in most soils it should be supplemented with a dressing of bone meal or superphosphate, as trials indicate that phosphoric acid requirements are high, though the need for potash seems to depend more on soil type. Very little nitrogen is usually required and an excess causes too much top growth at the expense of tubers. As roots are very sensitive to injury, fertiliser should be well worked along the row a week or two before planting.

Planting can be done on the flat, but where there is no danger of soil drying out it is usually done on broad, low ridges, which warm quickly. This simplifies digging of the crop. Care should be taken that the rooted shoots do not dry out between lifting and planting. If necessary, they should be puddled in thick muddy water.

In the home garden slips should be set out 16in. apart on the flattened tops of low ridges 24in. apart. Plants, which should be set about the same depth as they grew in the propagating bed, are considered to make better tuber development if the rooted portion of each plant is bent up like the bottom end of a J. Plants should be watered when they are set out if conditions are dry. Apart from weed control and the repair of broken ridges, cultivation is unnecessary, though vines are usually lifted occasionally to prevent their rooting, as such rooting appears to favour leaf rather than tuber development.

Though in some seasons kumaras can be grown in warm, sheltered areas as far south as Christchurch, their culture commercially is confined to northern parts of New Zealand. They are classed as a tender to very tender crop. Though they can be dug in the home garden where conditions are favourable about 3½ months after planting, results are usually better if

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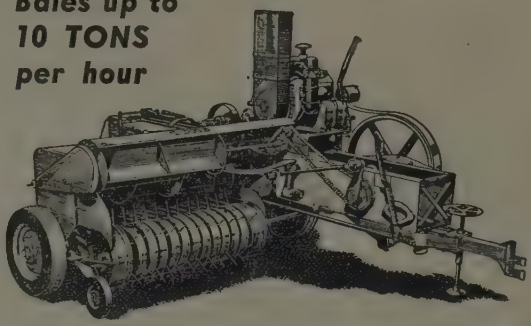

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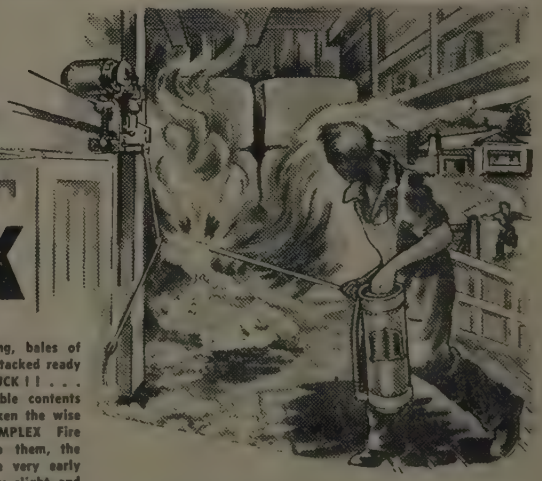

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they are left longer, as they gain rapidly in total yield as they near maturity and the table quality of mature tubers is better than that of immature ones. Tubers can be dug when the skins are reasonably firm or can be tested by cutting. When they are cut mature tubers dry rapidly on exposure to the air.

Lettuce

Where a succession of lettuce is desired a November sowing is best made in the situation where the crop is to mature. Though lettuces usually can be transplanted readily, the plants' ability to re-establish depends on the soil conditions into which it is transplanted. A moist soil and good growing weather allow roots damaged and destroyed during transplanting to be replaced quickly by new growth.

In November, when conditions are often dry, the check of transplanting, even if the work is done with the greatest care, is likely to be severe. Sowing seed in the place where the plants are to mature is therefore preferable.

Lettuce thrives in cool, moist, well-drained soils, but unless grown quickly it tends to be tough and bitter. Seed should be sown thinly ¼in. deep in rows 12in. apart. The soil should be cultivated to a very fine tilth and it should be rich in organic matter.

Good varieties for districts where conditions are hot include Great Lakes and Imperial 847 and Imperial 44. Where summer heat is more moderate almost any of the popular summer varieties, for example, Neapolitan (New York, Webb's Wonderful) or Success, are likely to give a satisfactory crop.

Peppers or Capsicum

In New Zealand peppers (*Capsicum* spp.) are grown as annuals, but there are annual and perennial varieties. Some peppers or capsicums are also known as chillies (the Spanish word for any kind of pepper). There are two general classes, the mild, used for salads and pickles or baked or used as a vegetable, and the hot, used for relishes, seasoning, pickles, and sauces. The small pungent or chilli varieties are the source of cayenne or red pepper, which is quite distinct from the commercial black and white peppers, which are derived from the fruit of *Piper nigrum*, a tropical woody plant.

Peppers require a warm situation and succeed in southern districts only when grown under glass. Even in warm northern districts which experience a long frost-free season they are best set out in a warm, sheltered part of the garden. Plants should be raised under glass like tomato plants and set out toward the end of October. Peppers require care in transplanting and should be planted 12in. to 24in. apart (according to habit of growth) in rows 2ft. to 3ft. apart. In warm localities fruits start to mature about March and continue until cut down by frost. Staking is unnecessary.

The soil should be warm, well drained, moist, and rich in organic material, but should not be too rich in nitrogen, as an excess may overstimulate leaf growth to the detriment of the fruit. Light soils are usually favoured, as they warm readily. In the setting of the fruit peppers are sensitive to soil and weather conditions. Manurial treatment similar to that recommended for tomatoes will usually give good results.

There are many varieties with different shapes and colours ranging from dark red to orange-red, yellow, and green. The most popular are those of the bell group, which are large-podded, sweet peppers used either in the green or in the mature stage, mainly for stuffing. Other important groups are the tabasco or chilli, cayenne, cherry, and pimento.

Popular mild, sweet varieties include California Wonder, Chinese Giant, and Golden Queen. Hot varieties are Long Red Cayenne and Tabasco.

Potatoes

Cultivation of established potato crops should be attended to by the removal of weeds and the banking of soil from between the rows against the haulms and developing tubers, so that the rows are hilled in steep, inverted V shape. This affords protection against caterpillars of the potato tuber moth and also ensures that should the foliage become badly infected with late blight, spores are not so likely to be washed on to the tubers and cause tuber infection.

Main-crop potatoes can still be planted. Well-drained soil rich in humus is preferable, and virgin soil or soil heavily manured for a previous crop is suitable. Grass clippings or a green crop dug in before planting will provide humus. Lime is rarely necessary or desirable, as the potato does well in an acid soil and the alkaline conditions induced by lime favour the development of scab disease, which is also common in soils poor in organic matter.

Popular main-crop varieties include Aucklander Short Top, Inverness Favourite, Dakota, King Edward, Arran Chief, Glen Ilam, and, in the north, Northern Star.

Late Blight

Late blight, also known as potato blight and Irish blight, does not appear every season in some districts, but in most parts of the North Island and in some parts of the South Island it is advisable to spray potatoes with a copper spray such as bordeaux mixture or copper oxychloride or one of the newer fungicidal sprays, since neglect of this precaution may result in total loss. Spraying should begin when plants are about 5in. to 8in. high and applications should be repeated at least at monthly intervals.

If, despite precautions, the foliage is severely infected and the crop cannot be dug at once, the haulms should be cut off at ground level, or the gardener can remove them by standing on the potato ridge (with one foot on each side of a plant to hold the tubers in place) and pulling the haulms away.

Rock Melons and Cantaloupes

The true cantaloupe has a hard rind and a rough, deeply furrowed surface and is rarely grown in New Zealand. The melon commonly grown is the rock or musk melon, which is characterised by a soft rind covered with cork-like netting. The name cantaloupe is frequently, though incorrectly, used in New Zealand for those varieties with heavy netting and comparatively hard shell suitable for transporting. Rock melons do not cross with cucumbers, pumpkins, or water melons.

To plant rock melons, hills or small hot-beds should be made as described for cucumbers and should be spaced 3ft. apart in rows about 5ft. apart. Wider spacings may be desirable in favoured warm areas where growth is more vigorous. Plants can be spaced four to a hill.

To induce lateral growth the leader should be pinched out as soon as three or four rough leaves have grown. When four main branches are well grown the fruit-bearing laterals may be allowed to develop and flower. The fruits should be thinned to about six or seven to each plant when they are about 1in. long, and any subsequent blossoms and any weak growth should be removed.

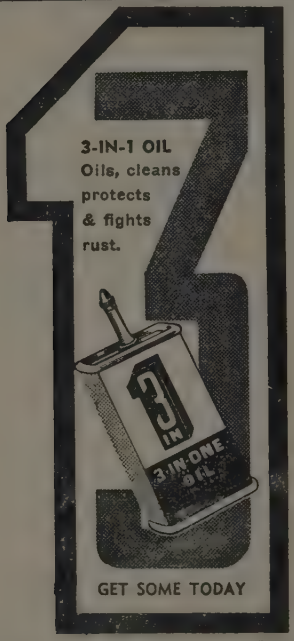
If the weather is very wet when the fruit begins to ripen, it should be protected from excess moisture by stretching a canvas sheet over a frame; otherwise the flavour is likely to be greatly impaired and the most delicious varieties become watery and insipid. The fruit should be picked as soon as it is ripe and this condition can be detected by the distinct perfume of the fruit. It is also indicated by the ends of the stems holding fruit turning soft.

Good varieties include Hale's Best and Bender's Surprise. Honey Dew and Casaba are good keeping varieties.

Water Melons

The culture of water melons is similar to that of rock melons except that water melons require a longer season of growth. They are more resistant to dry conditions and will grow in soils that are rather acid, but grow best on virgin soils or rich, sandy loams.

Home gardeners often find difficulty in producing water melons, as the



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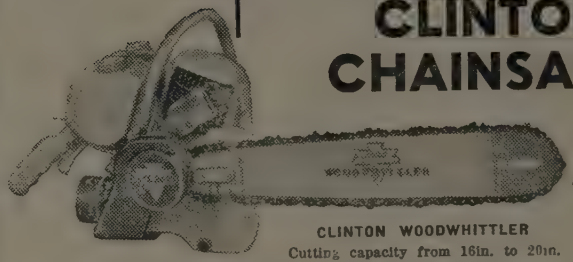

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plants are too long in making growth and form fruit too late in the season for it to mature. To overcome this plants should be raised in pots under glass and set out as described for cucumbers in a warm, sunny, well-drained situation with each plant over a pocket about 1 cub. ft. of partly rotted, fermenting stable manure. Plants should be shaded when first set out.

The home gardener sometimes has difficulty in determining when water melons are ripe. When the melon is immature it gives a metallic and ringing sound when hit with the back of the finger. When it is ripe the sound is muffled and dull.

Good varieties include Ice Cream, Coles Early, Klondyke, and Hawkesbury.

Preserving Melons

Preserving melons belong to the same family as water melons, but the flesh remains firm and does not change colour. They are much hardier and easier to grow than water melons and produce heavier crops.

Popular varieties include Citron (red seeded) and Pie (green seeded), which are principally used for jam making or for pies.

Tomatoes

Most varieties of tomatoes are damaged by more than a few degrees of frost and plants that have been raised under glass are usually particularly susceptible, as they are rarely as fully hardened off as they should be. Except in a few northern districts, tomatoes are usually set out in the field toward the end of October, though on level areas such as the Christchurch district, which tends to be low lying and is not directly on the coast, planting may have to be delayed until about the second week in November.

Soil preparation should begin early. A deeply dug, well-drained soil rich in humus and a warm, sheltered situation having the maximum amount of sunshine are best. Plants for setting out should be sturdy, erect, 6in. to 8in. high, and free from disease. The foliage should be an unblemished dark green and the bases of the stems a dark purple which as it extends upward gradually merges with the natural green of the plants.

Choice of Plants

It is advisable to obtain plants from a grower who uses sterilised soil, who takes other precautions against disease, and who does not crowd individual plants in the boxes so that they are thin and weak. Diseased plants will be an endless source of worry to the grower and are usually best destroyed. Similarly plants that have weak rooting systems or are thin and starved will suffer a severe check, particularly if the weather is unfavourable when the seedlings are planted out, and valuable time will be lost while they are recovering.

Hardening off should be done at home if the plants bought are tender and the weather is uncertain. Plants should be hardened off by gradually increased exposure to conditions similar to those in which they will finally be planted out.

Unless dwarf varieties are to be grown, provision must be made for supporting the plants. They can be staked individually or tied to wires supported by end posts; occasionally tall varieties are grown on two stems.

Acid or heavy soils should usually be limed, preferably in the previous autumn, at 3oz. to 4oz. a square yard, but on certain soils and particularly in high-rainfall areas lime can be applied at twice or three times this rate. It is preferable to apply moderate dressings at relatively short intervals than very heavy dressings at long intervals.

Manuring

Well-rotted organic material such as farmyard manure or compost is recommended for most garden soils, but it should be thoroughly mixed with the soil a considerable time before planting. Where additional fertiliser is necessary a balanced dressing should be applied.

Dwarf plants should be set not less than 2ft. apart in the rows and other types 12in. to 15in. apart. Rows should be 36in. to 48in. apart.

Good dwarf varieties include Stoner's Dwarf Gem, Adelaide Dwarf, Marglobe, and Early Chatham. Staking varieties include Beefsteak, Kondine, Best of All, Carter's Sunrise, Potentate, Moneymaker, and Stoner's Prolific. Numerous other good varieties are listed in most seedsmen's catalogues.

[*Green and Hahn*

Yams are a rather sweet-flavoured vegetable. They are not hardy, but they can be grown in most districts.

Yams

The true yam is a tropical plant with an edible root and belongs to the genus *Dioscorea*. The common yam of New Zealand gardens (*Oxalis crenata*) belongs to the same family as the shamrock, the foliage of which is somewhat similar. It is grown for the tubers, which are long and ovoid and are marked with numerous regular hollows. They have a smooth skin which may be yellow, white, or red. The end which joins the stem is usually slightly narrowed.

The plant, which has a spreading habit, grows well in warm situations in well-drained, rich soils. The yam is a perennial, but as it is frost tender, it is usually grown after the manner of potatoes. It is propagated by sets like the potato, but can be grown from cuttings, which are easily rooted.

The sets should be planted 3in. deep and 18in. apart in rows 2ft. apart as early as possible, but the time of planting should be arranged so that there will be no danger of frost damage to the foliage. In districts where the plant grows particularly well spacing should be more liberal.

As the stems lengthen they should be covered to within 6in. to 8in. of the tops with light soil or compost, as this assists the development of new tubers. The tubers, which are produced in great abundance, are rarely thicker than a small hen's egg; they do not swell much until fairly late in the season, and in most districts it is not customary to gather them until frost has cut down the foliage. The tubers of some strains have a somewhat acid taste when first dug, but quickly lose this acidity on exposure to the sun.

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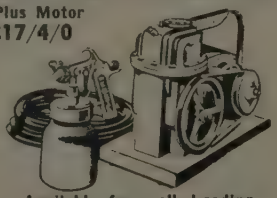

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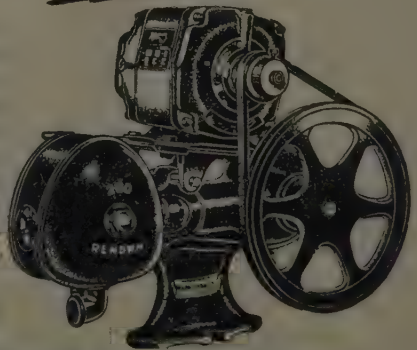

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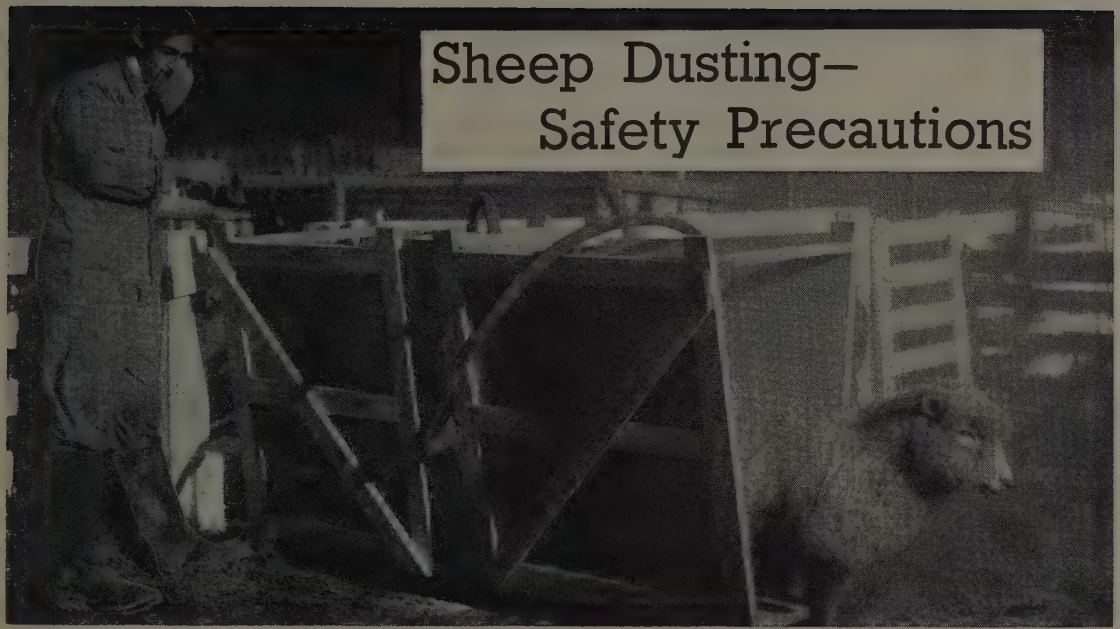
Sheep Dusting—Safety Precautions



Worker using an experimental dusting race and wearing a toucan face mask and practical protective clothing.

By P. L. THOMAS,
Scientific Officer, Department of Agriculture's Wallaceville Animal Research Station

SHEEP dusting, when properly carried out, is no more dangerous to the operators than ordinary dipping. From certain aspects it may be safer; for example, there is no risk of splashing a concentrated insecticide on the skin or in the eyes during mixing, and the concentration of insecticide in the dusts is much lower than in the concentrated powders used for preparing dips and is proportionately safer to handle. Any risk with dusting lies in the exposure of the operator during the actual dusting operation and safety measures are basically commonsense precautions to avoid breathing dust and to prevent any insecticide being absorbed through the skin.

FARMERS

THE farmer who uses a duster only a few times a year should observe these basic precautions:—

1. Arrange the machine so that the operator can stand up-wind from the race.
2. Wear a light nose and mouth mask whenever exposure to dust is unavoidable.
3. If possible, wear overalls which can be washed after dusting is finished for the day.
4. Wash hands thoroughly after each mob is treated, as absorption may be increased during periods of rapid perspiration.
5. Wash completely (including the hair if no hat is worn) at the end of each working day or, if operations do not extend over a day, at the end of dusting operations.
6. Wash hands thoroughly before meals and before smoking. Do not roll or smoke cigarettes while dusting.

Generally, outdoor dusting is preferable to indoor operation, but if the work is done indoors extra care must be taken.

The basic rule is: Avoid the dust and remove all traces of it by washing as soon as possible.

CONTRACTORS

Contractors may be exposed to daily exposure of dust over long periods and, as the effects of most insecticides are cumulative, extra precautions are required, in addition to those needed by farmers who are exposed to the dust only at infrequent intervals. These **additional** precautions are:—

1. Wear complete body protection (for example, full-length overalls) and headgear.
2. Wear goggles in addition to a face mask.
3. Wear clean overalls daily, if possible, or change them frequently.
4. Be extra careful to bathe daily and, if possible, take a shower between jobs if more than one farm is being treated in one day.

Contractors would be well advised to fit their vehicles with simple facilities for washing, as these are not always available at the working site.

Masks

There are a number of suitable masks available for this kind of operation. One of these is the toucan mask made of foam plastic. It is cheap, virtually unbreakable, and is comfortable to wear. It may be rinsed out like a sponge and when dry can be kept in a plastic pouch that lies flat in the pocket.

A toucan mask.

Information on suppliers of masks may be obtained from any Medical Officer of Health or any district office of the Department of Labour, though masks should be supplied with all machines and agents should be able to give information on the availability of spares and replacements.

Recommendations in this article for protecting those working with dusts have been approved by the Department of Health.

A Method of Joining Mole Drains to Existing Tile Lines

By A. A. DUNCAN,
Instructor in Agriculture, Department of Agriculture, Wanganui

THE drainage of clay country is best achieved by the use of a combination of mole and tile drains. The life of the mole drains is, however, relatively short, and sooner or later they have to be replaced. The problem then arises of making an effective junction from the mole drain into the tile drain because, if this is not done, the water backs up in the mole drain and the drainage is no better than before the operation was carried out. Mr. P. N. Jones, of Okoia, near Wanganui, was confronted with this situation after remoling a paddock that had been tile drained and mole drained 20 years previously and this article describes his method of solving the problem.

THE mole drains collected the water to the tiles and in wet weather there was a virtual lake of water above the tile lines.

In an endeavour to let the water away Mr. Jones dug down until the top of the tile line was exposed, but this did not meet with success. It was evident that for effective drainage the top of the tile line would have to be pierced. Rather than dig down and chip through the tile drain at each junction with the mole drain he decided to try to drill down through the ground and through the top of the tiles. Accordingly, a drill was adapted to a standard model chain saw and this was tried and found to be successful.

Left—The drilling machine in position to start drilling. Right—The machine in operation.

A technique for the adoption of the method was then worked out. First, the tile lines are pinpointed by use of a draining spear down the cut made by the blade of the mole plough. The side of the tile is located and then the centre is found; for example, if the tile is a 3in. one, by moving 2in. across the tile. The point is marked with a small peg and this procedure is repeated until all of the junctions are marked. The chain-saw motor is then started and all of the holes are drilled in one continuous operation, the operator being able to feel when the drill is through the top of the tile by the sudden give of the machine.

The drill is fitted with a tungsten carbide masonry bit and bores a hole an inch in diameter with practically no chipping of the tile. Any dust or fine pieces of tile are washed out of the tile lines by the first flow of water through them. When the drilling is completed it is simple to take off the drill and replace the saw.

The method is of particular use where tile drains have been originally laid down without a back filling of porous material such as gravel, hedge clippings, or hay. In these situations there is virtually no flow of water from the moles into the tiles when the paddock is remoled and it is necessary to pierce the tiles to allow entry of water to the drains.

▼ The drilling machine and a tile, showing the clean-cut hole.

VARIETY TRIALS WITH CEREALS

ONE of the duties of the Extension Division of the Department of Agriculture is to conduct variety trials with crops, and each year instructors arrange trials on the properties of co-operating farmers in many parts of New Zealand. In this matter close liaison is maintained with the Crop Research Division of the Department of Scientific and Industrial Research. Promising material from that Division, which is concerned with plant breeding, selection work, and pure seed production, becomes available for trial under different district conditions through Extension Division officers stationed throughout the country.

A DESCRIPTION is given here of recent results from trials conducted in this manner with cereal crops.

WHEAT

For some years a line of wheat bred by the Crop Research Division and known in trial work by its number, 313.01, but now known as Aotea, has shown outstanding yielding ability, general field characteristics, and suitability for header harvesting. With the exception that its baking quality, an important factor, was suspected to be lower than that of Cross 7, its performances have for some time suggested it to be a logical replacement for that variety—that is, for autumn sowing in the main wheat-growing areas of Canterbury. In the 1956-57 season some reselections of Aotea made because of promise of better baking quality were grown in Extension Division trials. The results from this year of trials indicate that the reselections have lost nothing in yielding and general field capabilities and are, indeed, highly promising. In addition to these results it is now considered, after a series of years of baking quality tests, that the baking quality of Aotea is about similar to that of Cross 7, and the variety will be released commercially later.

The newly named variety Arawa, which also has quite a long record in Extension Division trials under its number 393.01, was again included in trials in the South Island in 1956-57 in areas to which it is particularly suited—that is, heavier land where Dreadnought is normally grown. It performed well, giving high yields combined with good field characteristics. It is generally slightly lower in yield than Aotea, but has considerably taller and heavier straw. One of the disadvantages of this variety is poor baking quality; it is much inferior to Cross 7 in this respect.

In the North Island, where an appreciable amount of spring-sown wheat is grown, the variety Gabo, which originated in Australia, has been very promising for a number of seasons. It appears to be more suitable than Tainui, the variety most used at present, on account of its much greater ability to resist lodging. Considerably shorter than Tainui, it is also slightly earlier in maturity and at the least equals Tainui in yield.

This variety may also be useful in South Otago and Southland in late spring-sowing conditions.

HEADING PHOTOGRAPH: Harvesting a Departmental wheat variety trial.

BARLEY

Though there was a cessation of malting barley variety trials in 1955-56 owing to loose smut infection appearing in some lines, with the consequent necessity for hot-water treating of seed, the trials were resumed in 1956-57. The main varietal comparisons were Kenia and Research, two varieties already well known and in use, with two recent introductions, Carlsberg (a Danish variety) and Proctor (produced by the Plant Breeding Institute, Cambridge). The new varieties are very similar to Kenia in appearance, though Proctor is appreciably later in maturity. Proctor, perhaps because of the time which it takes to reach maturity, appeared to suffer in yield where the trials were sown late. Carlsberg clearly outyielded all of the other varieties, and as this has occurred in two seasons, its superiority in this feature seems established. Carlsberg, Proctor, and Kenia are all superior to Research in their ability to resist lodging. Research often becomes lodged when yields are at all heavy. Carlsberg and Proctor are now being compared with other varieties in malting tests.

OAT

In Extension Division trials with oat varieties in recent years the British variety Milford has become the standard against which other varieties and newer introductions are judged. Milford has been shown to be a lodging-resistant oat with high yields and grain of reasonable milling quality, and it can readily be header harvested. Varieties with which it has been compared in recent years are Onward, Steel, Minor, and several numbered selections bred by the Crop Research Division. Of these, Steel, a Swedish variety also known as Sun II, has been the most outstanding. Though considerably taller than Milford, it has very strong straw and it seems about equal to Milford in resistance to lodging. In 4 years of trials Steel has significantly outyielded Milford in about half of the trials. Minor, a Danish variety, has also performed quite well in a number of trials, but though it yields well, it has occasionally shown a tendency toward stem break. Onward, a well-known variety, suffers extensively from stem break and lodging. Several selections bred at the Crop Research Division have shown promise in some trials, but not in others. In some localities weaknesses of straw have been exposed, and in others undesirable lateness of maturity.

—*K. COTTIER*

Soil Conservation on North Island Hill Country

By A. N. GLASS,
Soil Conservator, Department of Agriculture, Wellington

SPECTACULAR results achieved from a demonstration of practical conservation farming on steep eroding hill country in Pohangina County, near Palmerston North, initiated by a survey of about 34,000 acres of this problem land, are described in this article. Application to 330 acres of this hill area of a conservation system of farming involving pasture improvement, grazing management, tree planting, and gully control over 3 years at a cost of about £6 per acre has resulted in:—

A 46 per cent. increase in the number of sheep wintered.

A 34 per cent. increase in the number of ewes wintered.

A 40 per cent. increase in the total wool produced and in the weight of wool per sheep.

Virtually complete control of the severe headward erosion in the gully.

Substantial control of the remainder of the eroding gully by tree planting.

Successful establishment of a valuable farm woodlot on what was previously a comparatively useless, eroding area.

Ensured permanence and productiveness of the farm as a whole in a practical and economic manner.

THESE outstanding production increases were achieved in spite of releasing from grazing an eroding area of about 30 acres. The cost of the work could be recouped from the increased revenue in a few years.

THE SURVEY

As a 34,000-acre portion of this productive county is beset with severe soil erosion, the repercussions of which were beginning to be felt in the lower Manawatu River basin in the form of increasingly severe and frequent flooding and silting, it became urgent to evolve a practical and economical scheme to cope with the problem. As a start a conservation survey to define the nature and extent of the problem, to assess the effects, if any, it was having on the farming of the area, and to recommend practical and economic ways of alleviating erosion was undertaken.

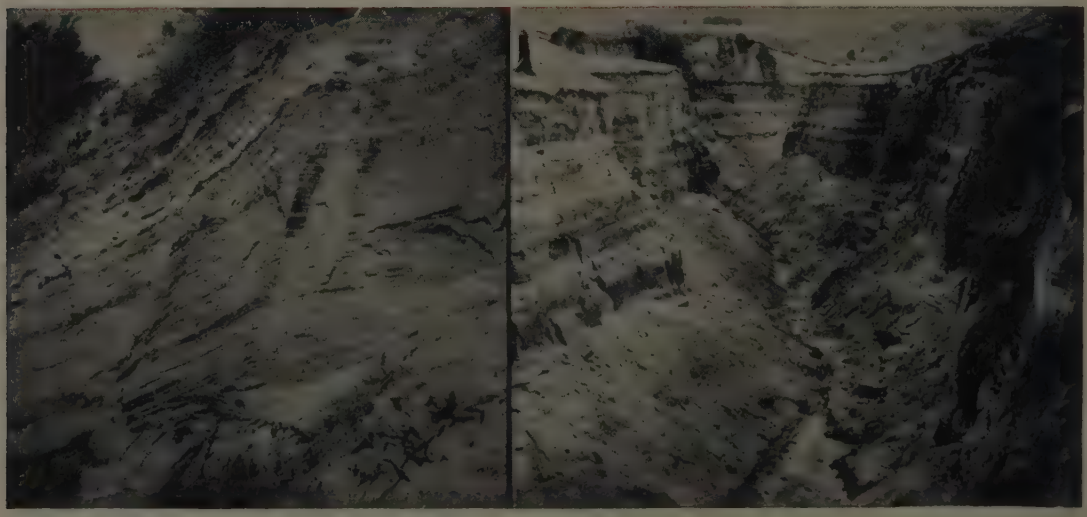
The survey established that there were three basic causes of the severe erosion:—

The geological nature of the area. In ages past, the area was the bed of a shallow sea, since raised by earth movements to its present altitude of 700ft. to 1800ft. above sea level. This old sea bed is mainly of unconsolidated sand.

The rapid change from a dense forest vegetation to one of generally poor pasture.

The failure, through lack of knowledge only, to adjust land use to this combination of conditions.

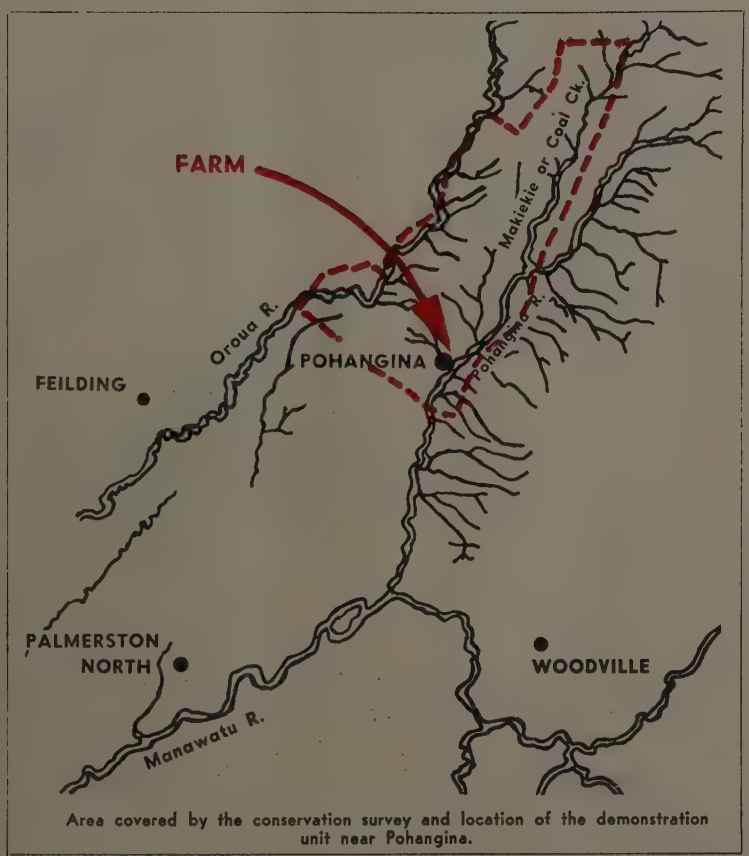
Erosion was found to be widespread and generally severe. It was present in many forms, simple and complex.



Unconsolidated erodible sands of the area (left) and one of the worst of the gullies—really a canyon—in these sands (right).

Heavy stock losses can and do occur in gullies such as this.

Slipping on the steeper slopes paves the way for scrub invasion of pastures.



Area covered by the conservation survey and location of the demonstration unit near Pohangina.

The most spectacular form was that of gullying and canyoning. Adverse effects of this erosion on the farming in the locality were found to be:—

1. Heavy stock losses in the numerous eroding gullies.
2. Mounting fence maintenance costs.
3. Increasing scrub infestation where slipping occurred.
4. Increasingly difficult internal farm access.
5. Increasing county rating due to frequent road damage.
6. Falling tendency in market values of properties concerned.
7. Lowering of net farm incomes.

As a basis for establishing a scheme of action for the area an analysis was made of various things noted in the survey such as steepness of slope, severity and type of erosion, soil types, and vegetative cover. From these data was derived a land-capability map, on which the five land-capability classes were shown. **Land capability is simply a practical assessment of the best use to which any piece of land can be put consistent with its permanence. On farmed land this is, in the final analysis, permanent, productive, and hence profitable farming.**

In this survey the details of the five classes used are briefly as follows:—

Class I: Flat or gently rolling land. Fertile and capable of cultivation in its present state. No special conservation practices required. Comprises 2.5 per cent. of the area surveyed.

Class II: Flat to gently rolling land. May require drainage, flood protection, or the like to make it suitable for cultivation. No special conservation practices required, except perhaps on

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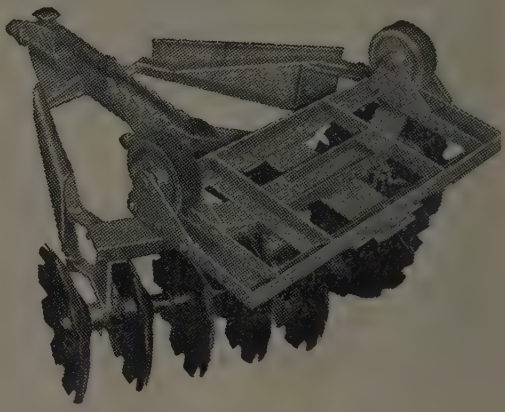

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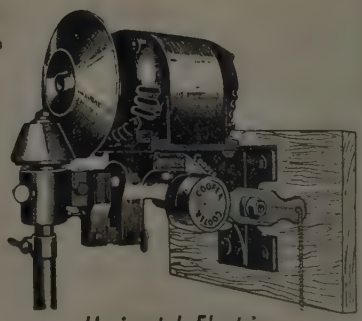

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SOIL CONSERVATION ON NORTH ISLAND HILL COUNTRY

[*Department of Scientific and Industrial Research*
Costs must rise where this continually happens to fencing.

the rolling land if this is frequently cultivated. Comprises 16.5 per cent. of the area surveyed.

Class III: Rolling to moderately steep land, not suitable for cultivation but very suitable for permanent, high-producing pastures. Requires little or no special treatment under present management. Comprises 31 per cent. of the area surveyed.

Class IV: Moderately steep to steep land suitable for high-producing pastures. Intensive, special conservation practices required, such as open tree planting and gully control measures. Comprises 30 per cent. of the area surveyed.

Class V: Very steep to precipitous land. Use for pasture is very restricted. Requires more or less urgent treatment. Comprises 20 per cent. of the area surveyed.

This classification made it possible to recommend the basic measures necessary to cope with the problem.

THE DEMONSTRATION

With the nature and extent of the problem established and control measures recommended the demonstration was undertaken with the object of solving the problems by changes in land use which did not involve the farmer in any monetary loss and ensured permanence and maximum productivity. The demonstration unit selected was the 428-acre property of Mr. L. Tews, near Pohangina township. About 330 acres of the farm is steep to very steep hill country with typical, moderately severe gully erosion. The balance of the farm consists of flat terrace country. This gullying was causing various problems of management and contributing to flooding and silting in the adjacent township.

Climate

Generally the climate is equable, favouring generous pasture growth. Of greatest significance is the 40in. annual rainfall, most of which falls from late autumn to spring. There is a tendency for summer droughtiness, but the nature of the soil reduces this to some extent.

With the maximum rainfall in winter, the soil and subsoil tend to become saturated with moisture, so predisposing them to erosion. Occasional heavy but short summer falls can cause severe local damage.

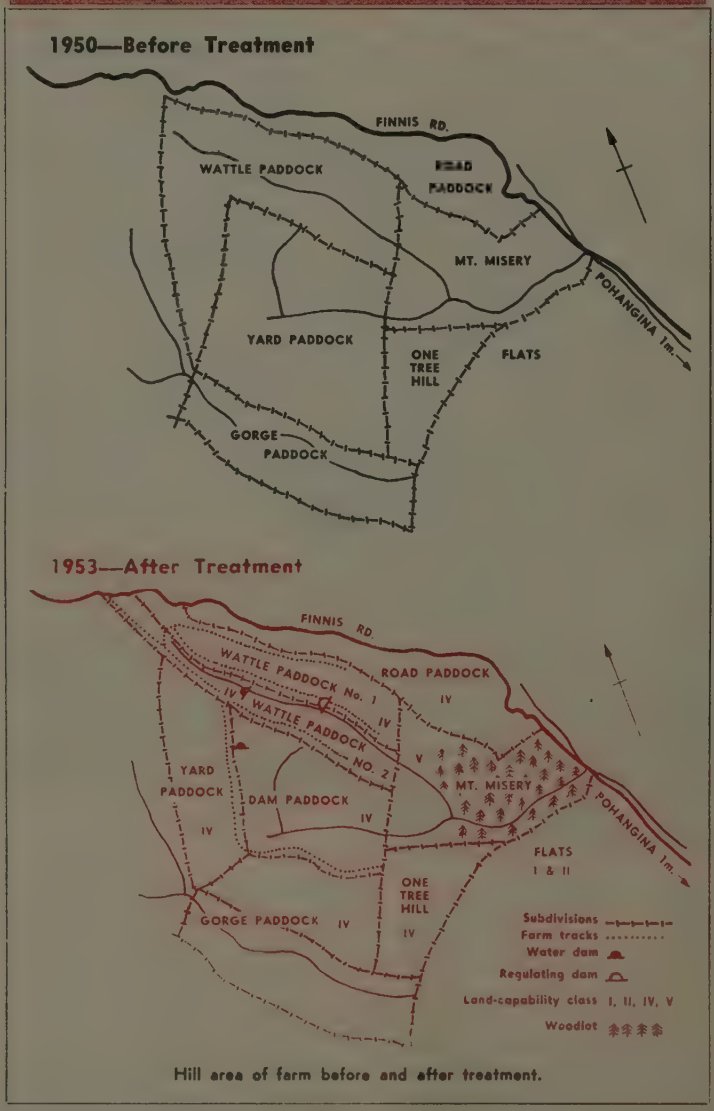
Geology, Topography, and Soils

The area on which the farm is situated is geologically quite young, the material forming the undermass being unconsolidated sand, the Castlecliffian sands. This sand, because of its lack of compaction, is very easily eroded when exposed to running water.

As slopes are both long and even and range up to 32 degrees, the general topography of the farm can be said to be steep to very steep. However, the higher portions of the property are somewhat easier. The hill area is drained by two catchments of similar area, and it was in one of these that the serious gullying was occurring.

A detailed soil survey of the area revealed that for all practical purposes the hill country of the farm consisted

SOIL CONSERVATION ON HILL COUNTRY



Hill area of farm before and after treatment.

of one soil type, Pohangina loamy sand. This soil has 1in. to 5in. of a light brown loamy sand on greyish-yellow sand. Of medium fertility, the soil gives a fair response to phosphate dressings, and in the absence of these tends to revert to manuka.

Vegetative Cover

The hill country was cleared from bush early in this century and sown to pastures. These pastures before being improved can be conveniently described according to the aspect.

On the northerly or sunny aspects danthonia dominated and was associated with browntop and small amounts of sweet vernal and cocksfoot. Clovers, when present, were mainly of a low-producing, annual type. Pastures on the colder, southerly faces were browntop-Yorkshire fog dominant with a little sweet vernal and cocksfoot. Moss frequently occurred and rushes were found on local wet areas. There were bracken and hard ferns on the less fertile areas and manuka scrub where the pasture cover was particularly weak or not attractive to stock. On local fertile areas, such as stock camps, ryegrass, dogstail, and some white clover were to be found.

Other General Conditions

On this hill country there were 6 paddocks, ranging from 30 to 100 acres. Access to the hills was poor and movement on them was not easy, packhorses being used when required. In the drier months the water supply was unreliable. No regular topdressing of this hill country was undertaken and any manure purchased was applied to the better terrace country.

The ewe flock of 500 together with the hoggets (130) were set stocked, in the traditional hill-country manner, all the year round. The flock lambed in August. The lambing percentage was 96 and the average mortality for all sheep was about 3 per cent. The ewes clipped about 9lb. of wool and the hoggets (shorn as lambs) 9.5lb.

Soil Erosion and Control before 1950

From about 1936 erosion began to make its presence felt within the farm (and also in the district generally). The problem gradually increased in severity until 1947, when an attempt was made to arrest it. Until 1950 works were undertaken with partial success only, in the gully bed itself, brief details of which follow:—

1947: Three pole and netting debris dams together with some fascines were installed. Two of these dams still exist.

1948: Eight further similar dams were constructed.

1949: Three tripod-type debris dams were built and the gully heads planted. Two of these dams remain.

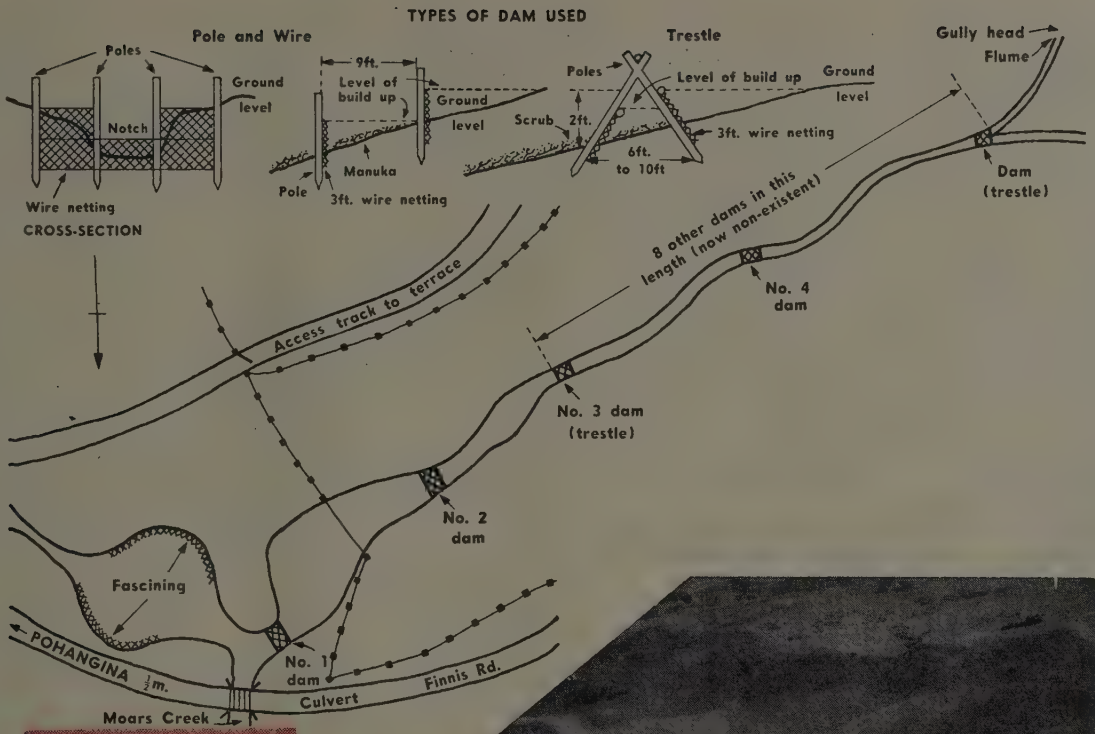
Works to this stage cost about £210.

1951-54 Conservation Programme

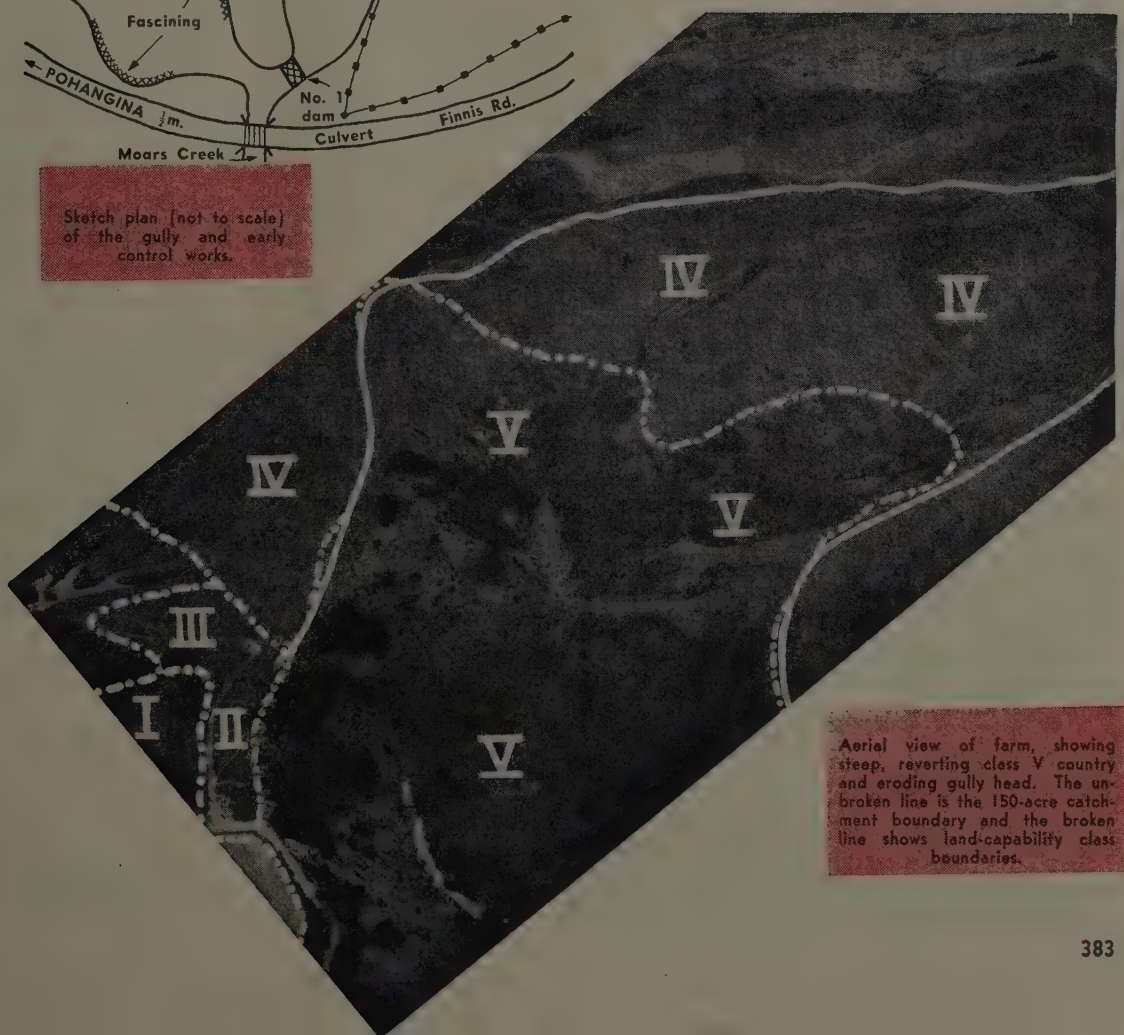
The demonstration proposals based on a land capability assessment of the farm were first put into operation in 1951. This classification resulted broadly in all but about 30 acres of the hill country being classed as class IV. The 30 acres, placed in class V because of its steep eroding nature, was recommended for use as a farm woodlot.

On the 300 acres of class IV country a comprehensive recuperative programme was undertaken. The aims were to reduce run-off and soil loss, control this run-off in the gully system, and obtain maximum safe use of the pastures and consequently the highest production consistent with permanent land use.

In essence the conservation programme was pasture improvement with modified grazing management and complementary erosion control works.



Sketch plan (not to scale) of the gully and early control works.



Aerial view of farm, showing steep, reverting class V country and eroding gully head. The unbroken line is the 150-acre catchment boundary and the broken line shows land-capability class boundaries.

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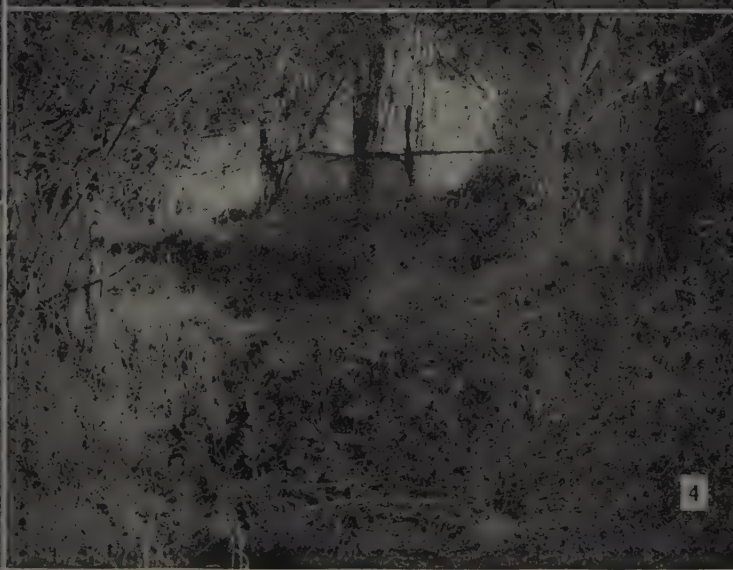

1—Typical class V land which was planted to form the woodlot. Gully plantings in foreground.

2—Poplar pole fenceline between Wattle Paddocks Nos. 1 and 2, showing the steep slopes and pond.

3—Dual-purpose flood-discharge regulating dam from upstream side. Note pipe (arrow) through the wall. The dam also provides water for stock.

4—The original dam (No. 1 on sketch plan on page 383), at the back of which is a new trestle dam, in May 1956. The build-up here is over 2½ft. Vigorous growth has been made by willows and the creek bed is now adequately protected by a dense mat of willow roots assisted by other upstream conservation works.

Pasture Improvement and Grazing Management

As pasture improvement results in greatly increased herbage production, an important primary step was increasing the number of paddocks. Three extra paddocks were made by relocating existing fences and erecting some new ones, involving in all 140 chains. This increased the total number of paddocks to nine and reduced the average size from 65 acres to 46 acres. Fencing was facilitated by providing bulldozed access tracks as required. An adequate water supply was provided as the subdivision demanded.

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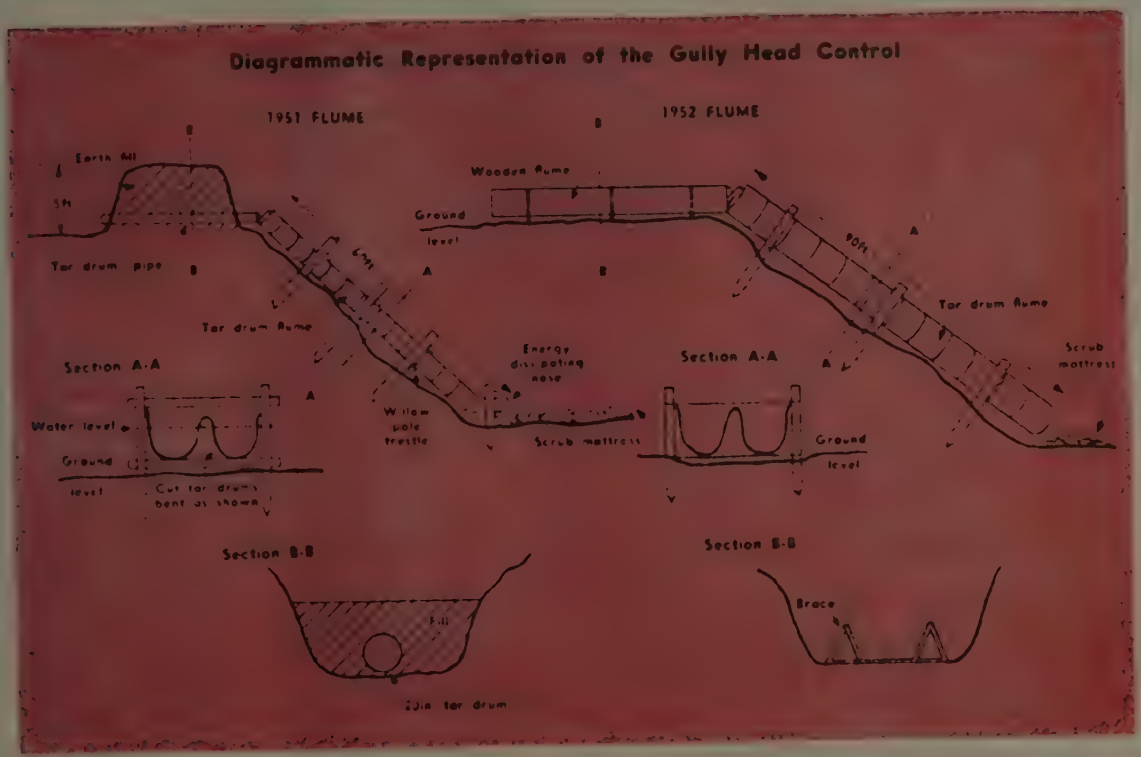
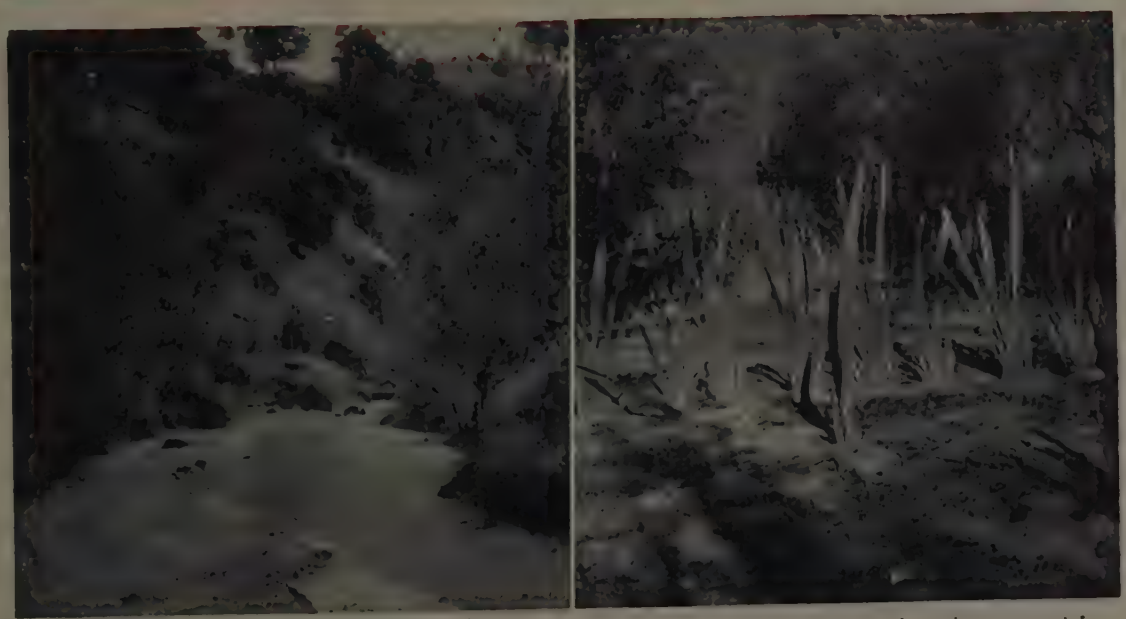
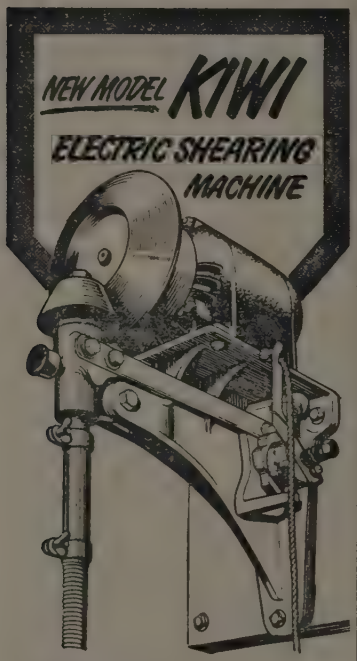




Left—Looking upstream from a point slightly above No. 1 dam in March 1952. Right—View at about the same spot in May 1956. The flax is part of a recent small experimental planting.



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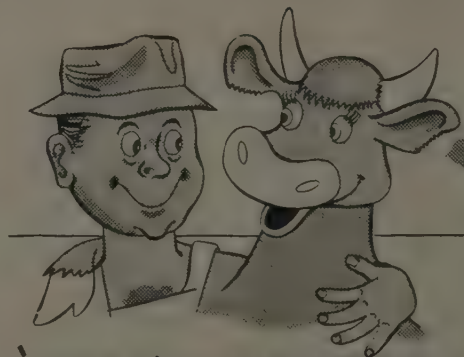

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Left—View in June 1953 from junction of gullies, looking up the right branch. In the foreground is a new trestle dam across the junction. Right—View from about the same spot in May 1956.

Much of this fencing was of an experimental type using sheep netting and live poplar poles for posts. This expedient, as was expected, proved satisfactory only where there was good, moist subsoil; for example, the line between Wattle Paddock No. 1 and No. 2 (see lower map on page 382). Elsewhere, as the strike of poles was only fair, some posts had to be subsequently provided.

Progressive oversowing and topdressing were undertaken as the subdivision proceeded. In autumn 4lb. per acre of a mixture of 2lb. of Certified white clover, 2lb. of Certified subterranean clover, and ½lb. of *Lotus major* (*uliginosus*) was sown on a hard-grazed sward. Superphosphate at 2cwt. per acre was applied from the air at the same time, with a similar dressing the next autumn.

Grazing subsequent to oversowing aimed at encouraging clover. As they could be spared from grazing paddocks were spelled the following spring to obtain a set of seed.

The grazing management system was modified to a considerable extent from that of traditional set stocking to one known as mob stocking or mobbing. In such a method of grazing, paddocks are heavily stocked in turn so that the pasture herbage available is used to the fullest extent in the shortest possible time. Selective grazing and constant overgrazing of the more valuable and palatable pasture species, as tends to occur under the set stocking system, are reduced to a minimum. For best results with the mobbing system a relatively large number of small paddocks is needed. Such a system was applied on the property to the extent that the number of paddocks and the number of sheep available in one mob (500) would allow.

Use of this grazing policy, coupled with spelling for seeding and conservation of feed for periods of shortage, enabled maximum use to be made of the herbage produced; that is, the stocking rate was at a maximum safe figure.

Simultaneously the vigour and composition of the pasture cover and consequently its erosion-resistant characteristics were greatly increased.

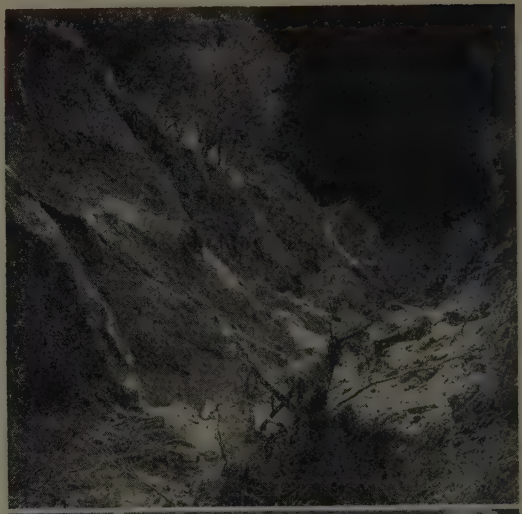
Complementary Erosion Control

Integrated with the programme of pasture improvement was an extensive plan of tree planting and gully stabilisation.

The main project in tree planting was the block planting at 6ft. centres (1200 per acre) of about 20 acres of the class V country on Mt. Misery. Douglas fir (*Pseudotsuga taxifolia*) was used, except on a small experimental portion. Because of heavy scrub, fern, and grass growth the trees were slow to establish and assert themselves, but they are now thriving.

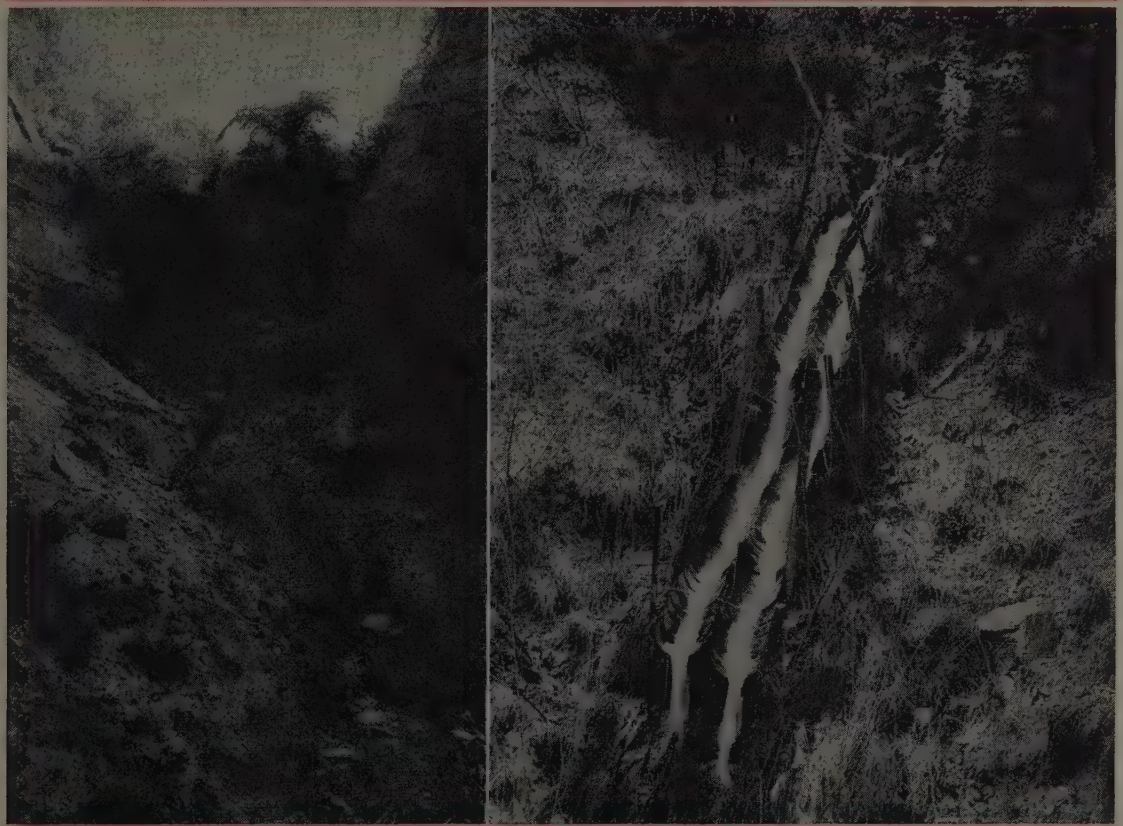
This block will form a valuable source of farm timber in the years to come, and the area lost to grazing has been compensated for many times over by the pasture improvement undertaken elsewhere on the farm. The small return from grazing from this rough, steep, and eroding area when considered in relation to the physical effort involved in obtaining it further emphasises the necessity of carefully evaluating the best permanent use for any piece of land.

The mechanical measures employed were of three types, but all had as their objective the safe conduct of water over the longest possible time from the upper catchment down through the catchment itself to the



▲ Upper—Looking downstream toward the gully junction from below the flume site in November 1953. Lower—the same view in May 1956.

← Upper—The gully immediately below the eroding gully head in November 1953, showing debris falls from the gully walls being removed by the stream. Lower—From about the same position in May 1956. A feature is the revegetation (mainly tutu, hard fern, and silver poplar).



Left—The gully head flume when completed in November 1953, showing the bare gully sides and the manuka-protected flume outfall. Right—The base of the gully head flume in May 1956, showing prolific growth of silver poplar and revegetation of the bare sand by grasses.

lower levels. In the upper reaches of the stable, left-hand branch of the 160-acre catchment a dual-purpose, flood discharge regulating dam was constructed. Besides providing a reservoir of water for stock the dam enables excess run-off to be stored and released gradually. By this means the volume and velocity of the flow past a particular point and hence its eroding ability are greatly reduced.

The dam was constructed with a bulldozer to a predetermined size in the normal manner, except that a reinforced concrete pipe of a previously calculated size (9in.) was placed at a certain level in the wall as the dam was built.

The topography in the Dam paddock which feeds run-off into the right branch—the most critical branch—precluded the use of such a regulating dam. This meant that sole reliance had to be placed on safely conducting the run-off over the eroding gully head. In 1951 this gully head was about 30ft. high, and it would retreat up the gully by varying but substantial amounts with each storm. A flume capable of taking the entire flow over this head seemed to offer distinct possibilities in overcoming the problem.

How this was achieved is shown in the diagram on page 387. Just above the fall a low earth bank was constructed and through its base a tar-drum "pipe" was laid. The flume proper was built out of half sections of tar drums supported on a trestle of willow poles. Water flowing through this pipe then discharged on to the flume itself and so down over the fall. The whole area surrounding the flume was heavily planted with willow and silver poplar poles and wands. Scrub-mattress protection was provided where required.

Because maintenance was found to be heavy, the tar-drum intake was dispensed with the next year (1952), being replaced with a simple wooden flume of similar capacity. In addition the flume was extended by another 30ft. and the surrounding plantings reinforced. To supplement these works other gully plantings of willows, poplar, and other suitable species were made down the whole length of the gully.

Result of Demonstration

The primary object of the demonstration—the permanent and productive use of land by economic and practical methods, with added substantial benefit to the farmer—was achieved with outstanding success.

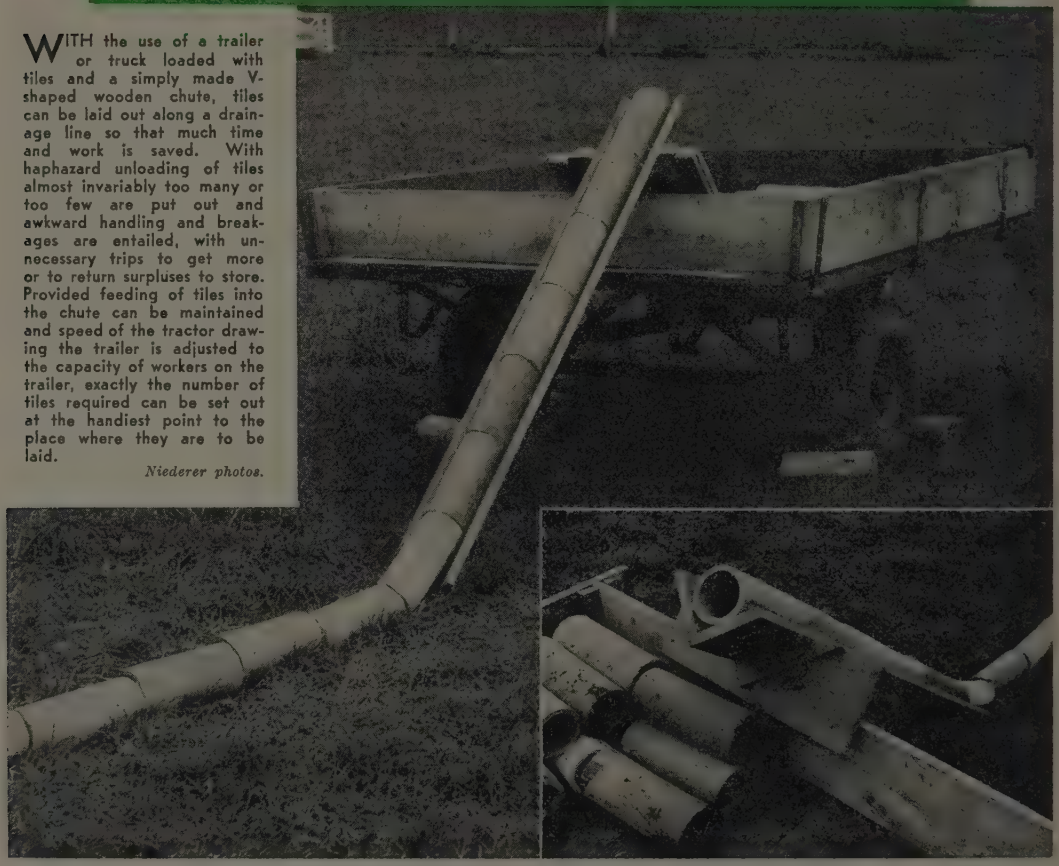
Adjustments to land use, radical in the case of the class V land—from grassland to farm woodlot—involved the farmer in no loss. On the contrary, by improvement of the pasture land, its management, and its soil protecting properties, production was

(Continued at foot of page 392)

Laying out Tiles for Farm Drainage

WITH the use of a trailer or truck loaded with tiles and a simply made V-shaped wooden chute, tiles can be laid out along a drainage line so that much time and work is saved. With haphazard unloading of tiles almost invariably too many or too few are put out and awkward handling and breakages are entailed, with unnecessary trips to get more or to return surpluses to store. Provided feeding of tiles into the chute can be maintained and speed of the tractor drawing the trailer is adjusted to the capacity of workers on the trailer, exactly the number of tiles required can be set out at the handiest point to the place where they are to be laid.

Niederer photos.



Soil Conservation

(Continued from page 391)

greatly increased and the cost of the scheme was recouped from the increased revenue in a few years. The following figures show how production rose:—

*Year	Sheep wintered: Ewes	Hoggets	Total sheep	Wool lb.
1950-51 ..	500	130	630	6,700
1951-52 ..	520	150	670	6,886
1952-53 ..	670	250	920	9,380
Over-all inc.	**170**	**120**	**290**	**2,680**
Over-all percentage inc.	**34.0**	**92.3**	**46.0**	**40.0**

(* Figures beyond 1952-53 have not been included, as the dairy herd grazing the flats was disposed of then and the whole farm has since been grazed by sheep only.)

On an acreage basis of 330 less the retired class 5 country of 30 acres, that is, 300 acres, and taking a hogget as equivalent to 3/5 of a ewe, the position is as follows:—

Year	Ewe equivalents: Total	Per acre	Wool: Total lb.	Per acre lb.
1950-51 ..	578	1.93	6,700	22.33
1951-52 ..	610	2.03	6,886	22.95
1952-53 ..	820	2.73	9,380	31.27
Over-all inc.	**242**	**.80**	**2,680**	**8.94**
Over-all percentage inc.	**41.87**	**41.45**	**40**	**40.04**

While this large increase in production was being achieved surprising results were being obtained with the control measures in the eroding gully. Illustrations show the remarkable changes which have occurred.

It seems reasonable to assume that the future stability of this gully is assured, and at a reasonable cost. Approximate details of costs were:—

Fencing	334
Seeds and fertiliser	899
Farm woodlot (trees and planting) ..	190
Flood regulating dam and access track	185
Wages and miscellaneous (mostly gully works)	412
Total	2,020

The cost per acre, on the basis of 330 acres directly benefiting, is slightly over £6. The considerable production increases obtained and the fact that the gully now ceases to be a problem amply justify this expenditure. Similar conservation farming systems can be applied with substantial benefit to other problem hill-country farms.

Acknowledgment

Acknowledgment is made to the co-authors of the Pohangina Survey, an unpublished report to the Soil Conservation and Rivers Control Council in 1950, for permission to use material.

Citrus Varieties and Rootstocks for New Zealand

By W. A. FLETCHER,
Citriculturist, Department of Agriculture, Auckland

THE author spent 3½ months during 1956 visiting Australia, Hawaii, California, Florida, and Jamaica to study techniques and research in citrus and sub-tropical fruit growing in these places, and in this article he refers to some of his observations overseas. The citrus tree, which is grown for the production of any one variety of fruit, does not occur naturally, but is man made. It is built, or propagated, from seeds and buds and the finished tree normally has two parts. The top, which originates from a bud, is called the scion, while the root, which originates from a seed, is called the rootstock.

CHOICE of scion variety and the rootstock is the first matter to be decided in growing a citrus tree, and this is a much larger question than might appear at first sight.

Choosing Scion Varieties

In Australia and the United States of America a policy of limitation of scion varieties has long been well established. In California only five varieties of citrus are commonly propagated. These are Washington Navel and Valencia oranges, Eureka and Lisbon lemons, and Marsh grapefruit. In New Zealand, however, there is still a tendency to propagate and grow too large a number of varieties, many of which have proved to be inferior under local conditions, and this is often the cause of confusion and disappointment to grower and consumer alike.

It is recommended that the propagation of citrus in New Zealand should be restricted to the following varieties, which are known to perform reasonably well under New Zealand conditions (reference is also made to rootstocks suitable for these varieties, but the subject of citrus rootstocks is discussed more fully in a later section).

Lemons

The principal varieties of lemons cultivated in New Zealand are the so-called "standard" varieties (Lisbon, Eureka, Villa Franca, and Genoa) and the Meyer.

Lisbon is slightly more resistant to cold than are the other standard varieties, but it is not as hardy as the Meyer lemon. The Lisbon grows well on the rough lemon and sweet orange rootstocks, but it can also be grown to advantage on trifoliata (*Poncirus trifoliata*) rootstock, which restricts the tree to a size more suitable for the average home garden and increases its hardiness.

The Eureka group, including the Villa Franca and Genoa varieties, are somewhat smaller trees than is the Lisbon and are generally better suited than is the Lisbon to most home gardens in warm localities because of their smaller size and their heavier summer crops. Sweet orange and rough lemon rootstocks are suitable for these varieties, but the trifoliata rootstock is not recommended meanwhile, owing to the possibility of serious stunting due to scaly butt virus infection.

Meyer is a hardy type of lemon that can be grown in cooler districts where other lemons do not succeed. Unlike other lemons the Meyer can be propagated from cuttings and it grows well on its own roots. Sweet orange and rough lemon are suitable rootstocks.

[*Sparrow*

Meyer is a hardy type of lemon that can be grown in cooler districts where other lemons do not succeed.

Grapefruit

The only varieties of grapefruit which have proved satisfactory under New Zealand conditions are the so-called **New Zealand grapefruit** (Morrison's Seedless and Lippiatt's strains) and **Wheeny grapefruit.**

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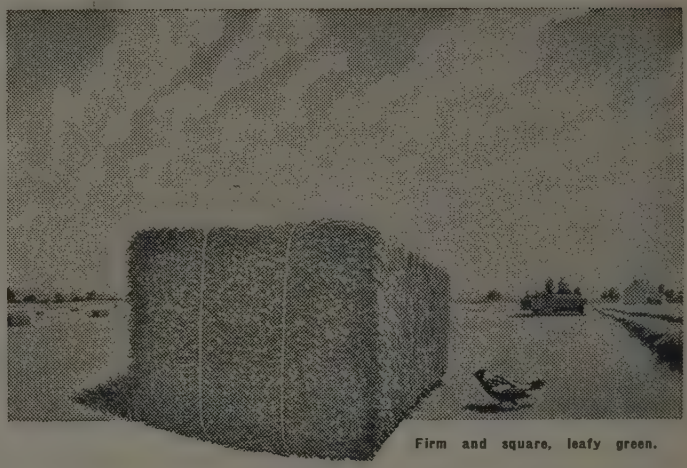

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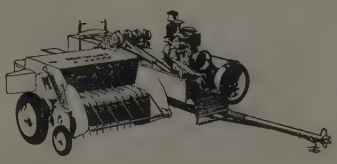

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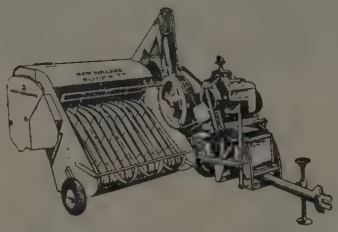

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Varieties of the type imported from overseas such as Marsh Seedless, Triumph, and Duncan usually produce extremely poor fruit in New Zealand and should never be propagated.

New Zealand grapefruit grows well on sweet orange and trifoliata rootstocks, but rough lemon is not recommended. Any of these three rootstocks can be used with Wheeny grapefruit.

Sweet Oranges

Contrary to popular opinion, excellent oranges can be grown in the warm parts of New Zealand provided the right varieties and rootstocks are chosen.

For commercial production good strains only of Washington Navel and Carter Navel are recommended for planting at present, but several other promising varieties are under observation.

For the home garden several different varieties can be recommended to spread the harvesting season of these fruits.

Navel oranges are early season fruits. As already mentioned, Washington Navel and Carter Navel only are recommended. Other navel oranges such as Robertson Navel, Groverly Navel, Navelencia, Thompson Navel, and Golden Nugget are not recommended, as they are inferior to good strains of Washington Navel and Carter Navel in tree vigour, cropping habits, and fruit quality. Sweet orange and trifoliata rootstocks are recommended. Yuzu rootstock also shows promise.

Best Seedless, which is an early to mid-season variety, originated in New Zealand and is well suited to the home garden, but on other than trifoliata rootstock, on which it grows very well, the tree is a shy bearer. Some strains of this variety are prone to produce a proportion of misshapen fruits.

Ruby Blood and St. Michael are mid-season oranges and prolific croppers suited to the home garden. These varieties grow well on trifoliata rootstock, but sweet orange also can be used.

Valencia is a late orange. Fruit quality is considerably improved when the tree is propagated on trifoliata rootstock.

Harwood Late is a promising late orange which arose in this country probably as a seedling of Valencia and can be recommended for propagation on trifoliata and sweet orange rootstocks.

Mandarins

Only four varieties of mandarins can be recommended at present.

Satsuma (or Unshiu) mandarins are the most frost resistant of any cultivated citrus variety and can be grown where summer temperatures are too cool for other oranges. **Silverhill** is a vigorous, heavy cropping strain of Satsuma which is especially recommended for planting. Satsumas ripen very early in the season. Trees remain small on trifoliata rootstock, but fruit quality is improved. Trees grow well on sweet orange, but fruit flavour is often insipid. Yuzu may have promise as rootstock for this variety.

Clementine is a more vigorous variety than Satsuma and it also ripens its fruit early. It grows very well on trifoliata rootstock. Sweet orange rootstock also can be used.

Thorny is one of the best flavoured of all mandarins. It is suitable for home gardens, but its fruit is too small for commercial growing. It ripens mid-season. Sweet orange and trifoliata rootstocks can be used.

Kara is a late variety which does particularly well on trifoliata rootstock.

It can be recommended for home garden and commercial planting.

Variety Investigations

Though the above-mentioned varieties give reasonably good results under New Zealand conditions, there is undoubtedly still a need to develop or discover better varieties, especially dessert varieties, that are even more suited to the climate, and investigational work is continuing in the field and in variety trials.

Some tangelo varieties, which are hybrids of mandarin and grapefruit, developed overseas and introduced by Dr. H. M. Mouat of the Fruit Research Station, Department of Scientific and Industrial Research, Auckland, are showing some promise for New Zealand conditions. In particular the Seminole tangelo developed in Florida, United States of America, is creating some interest here. It was interesting to observe, however, that Americans consider that fruit of this variety always remains too acid for their palates.

A much more popular tangelo in the United States, especially in Florida, is the Orlando. Seed of this variety was obtained in Florida and forwarded to New Zealand, where it is now being propagated at the Fruit Research Station in Auckland. The Orlando comes true from seed and the seedling trees appear to come into early bearing. The seed obtained was taken from a seedling grove.

During the whole of his overseas trip the author was constantly on the look-out for new varieties which might be worth a trial in New Zealand and at the United States Department of Agriculture Citrus Experiment Station at Orlando, in Florida, he came across some very interesting fruits. These were hybrids of Clementine mandarin and Orlando tangelo, the latter a hybrid of mandarin and grapefruit. A number of trees had been raised from this cross and nearly all were prolific croppers and were producing large, juicy, free-peeling fruits of excellent quality.

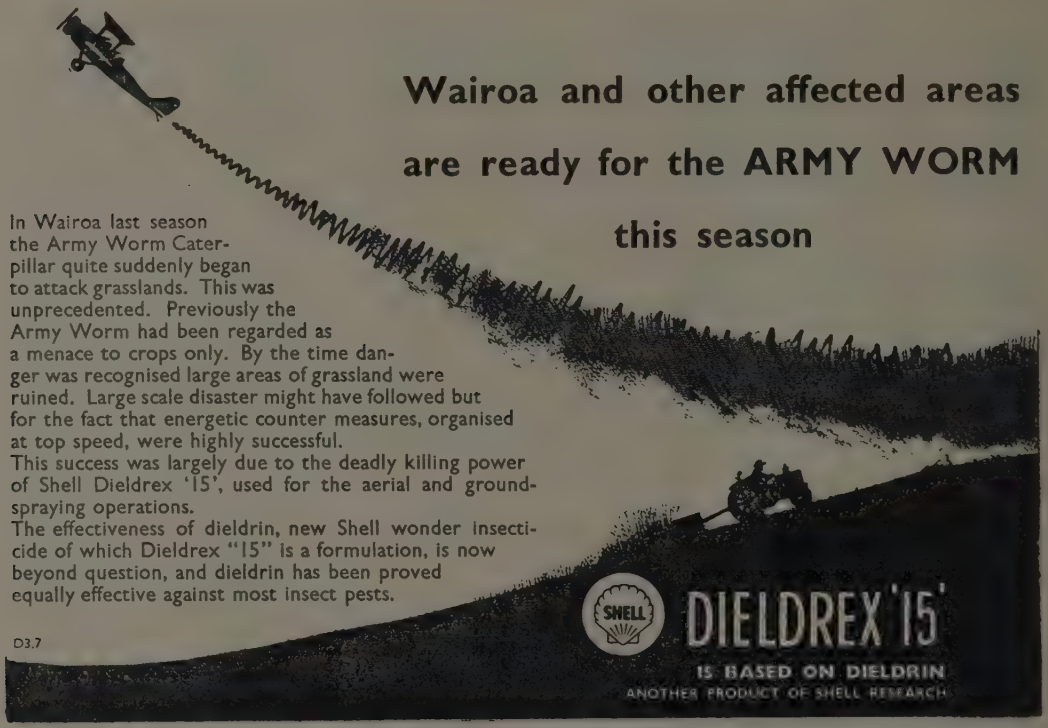
Though these varieties are actually hybrids, they will be called mandarins when they are ultimately released. The fruit from these hybrids was far superior to that from the Clementine mandarin parents growing close by. It is interesting to note, too, that though many other mandarin-tangelo crosses were made during this breeding programme, the Clementine-Orlando crosses were practically the only ones which gave worthwhile results.

Seed from these crosses was also obtained and forwarded to New Zealand and it will be interesting to see how the plants perform here. The reason for sending seed of these new varieties and not budwood was twofold. First, the United States Department of Agriculture has not yet officially released this material to the country's own industry, and secondly, there is a danger of introducing new virus diseases through budwood. This point is discussed further below.

During his visit to Jamaica the author was able to obtain, through the courtesy of the Jamaicans, budwood of their Ugli and their Ortanique varieties, the fruits of which have become very popular on the New Zealand market in recent years. Young trees have been propagated from this budwood at the Fruit Research Station in Auckland and appear to be thriving.

It should be emphasised that propagation material of Ugli and Ortanique is not available in New Zealand at present. Trees produced from the budwood recently obtained from Jamaica must be grown under quarantine to ensure they are free from disease, and it may be several years before any material can be released to growers from this source.

Some so-called Ugli trees have been raised from seed and offered for sale in New Zealand, but these are **not genuine** Ugli trees. It has been observed from experiments at the Fruit Research Station that Ugli seedlings are most variable and it is doubtful if many or any are true to type. On the other hand it appears that the Ortanique variety may often come true from seed. Even when genuine



Wairoa and other affected areas are ready for the ARMY WORM this season

In Wairoa last season the Army Worm Caterpillar quite suddenly began to attack grasslands. This was unprecedented. Previously the Army Worm had been regarded as a menace to crops only. By the time danger was recognised large areas of grassland were ruined. Large scale disaster might have followed but for the fact that energetic counter measures, organised at top speed, were highly successful.

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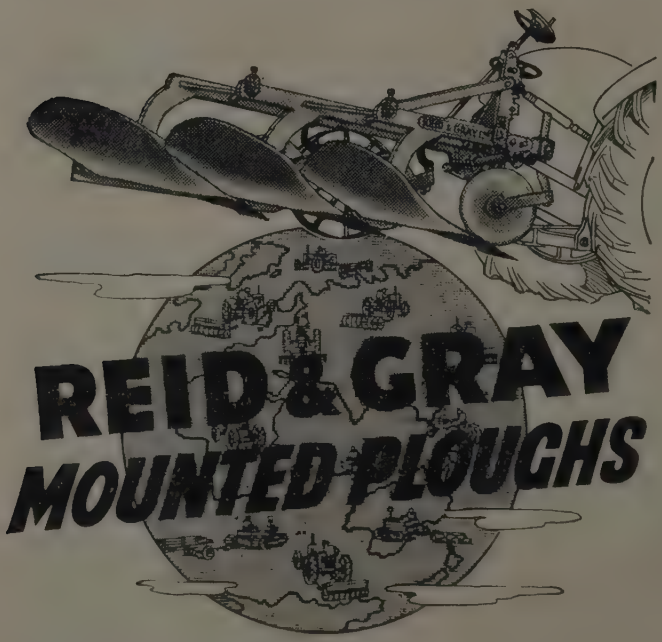

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trees of Ugli and Ortanique become available, their performances in the New Zealand climate, which differs greatly from the tropical conditions of Jamaica, could well be disappointing.

Currently there is much interest in the United States in the use of nucellar seedlings derived from commercial varieties. These seedlings retain the characteristics of the original variety, but they are much more vigorous and are free from the common virus diseases of citrus.

Seeds of most species of citrus produce two kinds of seedlings. One kind grows from a sexually produced embryo as a result of pollination. This appears to be the only kind produced by Ugli. It inherits certain characteristics from each parent and is therefore unlike either, though it may closely resemble them. The other kind are nucellar seedlings which arise from cells that surround the sac which contains the sexual embryo. This part of the seed is known as the nucellus, and as this tissue is derived from the fruit-bearing parent, these seedlings are genetically identical with the mother plant.

Because of their vigour, nucellar varieties are very promising, but there has been very little development or experience with them yet in New Zealand.

Bud Selection and Virus Diseases

All nurserymen and growers are aware of the need for careful bud selection to reproduce trees which are true to type, and it is not intended to dwell on this aspect. However, the importance of virus disease in relation to the propagation of citrus has opened up a new chapter in citrus budwood selection, which is still not very well understood by New Zealand growers.

Some of the viruses attacking citrus cause death of the trees, some bring about large reductions in tree size and productivity, and even the least noxious of them may be responsible for some decline in yield.

Very often symptoms of virus infection do not appear until the trees are several years old; for example, with the diseases of scaly butt, psorosis, and shell bark. Some of the viruses are spread by insect vectors, but for others no vector is known. However, all virus diseases are spread by the use of infected budwood. Consequently, it is most important that budwood be taken only from trees which are old enough to have exhibited symptoms and yet are showing no evidence of infection.

The following citrus virus diseases have been recognised in New Zealand to date: Tristeza, stem pitting, scaly butt, psorosis, and shell bark. Other virus diseases are known overseas, and as investigations proceed in this country some of these undoubtedly will be found to exist here too.

Stem pitting of a Marsh grapefruit tree.

Stem pitting on a Morton citrange → (trifoliata x sweet orange) intermediate stem piece of a young Carter Navel orange tree double worked to trifoliata rootstock.

Tristeza

The symptoms of tristeza vary according to the variety and rootstock combination. Sweet orange and mandarin trees on sour (Seville) orange rootstock are worst affected and show a rapid decline and ultimately die. The disease is readily transmitted by budding and by the common black citrus aphid. Fortunately the sour orange has never been used to any extent as a rootstock in New Zealand, so that the devastating effects of this virus disease recorded in many overseas countries have not been experienced here.

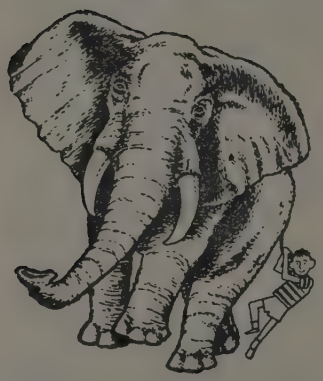
Stem Pitting

Stem pitting disease occurs in grapefruit (that is, true grapefruit such as Marsh Seedless) on any rootstock. Wheeny and New Zealand grapefruit, however, appear to be symptomless. Very severe pitting on Morton citrange (trifoliata x sweet orange) used as a rootstock for Carter Navel orange trees has been observed in New Zealand. Pitting of lime and trifoliata rootstocks also has been observed in New Zealand. This virus is transmitted by budding and the common black citrus aphid.

Scaly Butt

Scaly butt is a scaling of the bark of trifoliata rootstock and is associated with stunted growth. Sometimes stunt-

What's holding it back?



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ing occurs without evidence of scaling on the rootstock. Symptoms become evident 4 to 8 years after budding. No vector is known and the virus is spread by propagation from infected budwood.

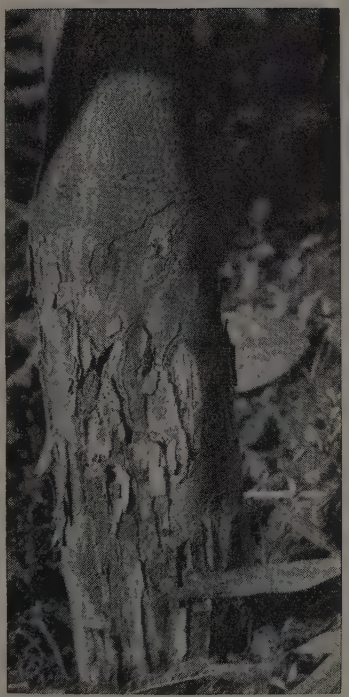
Varieties growing on any stock other than trifoliata can give no indication that they may be infected. Where trifoliata is to be used as a rootstock the scion buds to be worked on it should be selected from trees growing on trifoliata rootstock that are at least 10 years old and show no evidence of stunting or scaling of the bark on the rootstock.

Psorosis

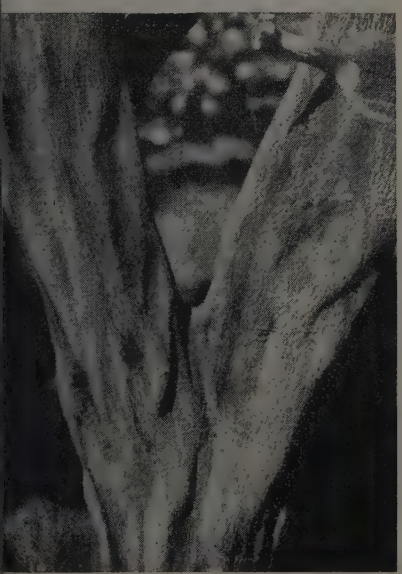
Psorosis does not appear until the trees are about 14 years of age. The form of psorosis causing a scaling of the bark which is most commonly found overseas has not yet been recorded in New Zealand. A form called concave gum psorosis causing gnarling and twisting of trunk and limbs has, however, been recognised in Surprise Navel orange trees in Tauranga. No vector is known and the virus is spread by propagation.

Shell Bark

Shell bark symptoms usually occur in lemons after about 18 years. The disease is widespread in New Zealand lemon orchards. Trees develop yellow foliage, leaf fall, and die back of twigs and the bark of the trunk splits and flakes off. The cause of the disease and the method of transmission are unknown.



Union of a stunted Temple hybrid orange tree on trifoliata rootstock (8 years old), showing the symptoms of scaly butt virus on the rootstock portion.



Concave gum psorosis virus disease symptoms on a 20-year-old Surprise Navel orange tree. The common scaling form of psorosis found overseas has not yet been recorded in New Zealand.

Citrus Rootstocks

There are three main rootstocks to choose from in New Zealand at present, namely sweet orange, rough lemon (citronelle), and the trifoliata orange (*Poncirus trifoliata*). In recent years another rootstock known as Yuzu (a hybrid of mandarin and *Citrus ichangensis*) has become available to some extent. The Morton citrange (*P. trifoliata* x sweet orange), Egyptian lime, and Cleopatra mandarin are also under investigation.

In overseas countries extensive use is being made of grapefruit, Sampson tangelo, Troyer citrange, shaddock, and others, but there is no experience of these in New Zealand. The rootstocks at present in use in New Zealand are generally satisfactory for most circumstances and the need to obtain better rootstocks is not such a problem as finding better scion varieties for New Zealand conditions.

In selecting the rootstock on which a citrus tree should be propagated consideration should be given to its resistance to *Phytophthora* root rot and collar rot, its suitability to different soils, its resistance to virus diseases, and its effects on the tree and fruits of the scion variety.

Sweet orange rootstock is suited to soils of light texture, good depth, and excellent drainage, and is more tolerant of neutral to alkaline soil conditions than is rough lemon or trifoliata. It is susceptible to root rot and collar rot caused by *Phytophthora* fungus and should not be used in conditions where soil moisture is likely to be excessive.

Sweet orange seems to be tolerant or resistant to all the main viruses causing decline and it produces vigorous trees of standard size. Good crops of quality fruit, especially lemons and grapefruit, are obtained with this rootstock. It is the least tolerant of drought conditions of the rootstocks commonly used in this country.

For some years a shortage of island sweet orange seeds has caused concern

Shell bark lesions on the trunk of a lemon tree.

to many citrus nurserymen. The New Zealand Fruitgrowers' Federation in Auckland has now established a source of supply direct from the Cook Islands and can supply seed if it is ordered in advance.

However, seed from any vigorous seedy variety of sweet orange growing in this country should be quite suitable for rootstocks. If nurserymen have difficulty in obtaining island orange seed, they should either plant a few trees for seed or locate vigorous old trees growing in their neighbourhood.

As a result of the sweet orange seed shortage the question has sometimes been asked whether seed of Poorman orange or New Zealand grapefruit, which is plentiful, could be used. This practice cannot be recommended, as grapefruit varieties are susceptible to tristeza virus, and while the author was in Australia he saw evidence of some Valencia orange trees on Poorman orange rootstock declining from this virus.

Trifoliata rootstock is undoubtedly more tolerant of heavier and wetter soils because of its high resistance to *Phytophthora* root rot and collar rot. It prefers acid soil conditions, but will not thrive in very acid soils. Trifoliata is subject to scaly butt virus infection, but this trouble can be avoided by budwood selection as already mentioned. It does not appear to be affected seriously by other common viruses.

Smaller trees are usually produced on trifoliata, making closer planting distances possible, which is a decided advantage in most home gardens. Despite their smaller size, trees yield as heavy and often heavier, more consistent crops than larger trees of the same varieties on other rootstocks. Moreover, fruit quality is always superior and fruits can usually be held on the tree much longer without deterioration.

Trifoliata is also more resistant to drought and is hardier than other rootstocks, enabling trees worked on it to withstand lower ranges of temperature. The trifoliata rootstock can be used successfully with all the scion varieties recommended earlier except with the Eureka group of lemons and with Meyer lemons.

Rough lemon (or citronelle) is as susceptible to *Phytophthora* root rot and collar rot as sweet orange, and therefore generally shows best response in deep, light-textured, free-draining soils. It also prefers an acid soil. Provided soil conditions are satisfactory, the rough lemon is a suitable rootstock for all lemons, including Meyer, and possibly for Wheeny grapefruit. It is not recommended for New Zealand grapefruit and **propagation of sweet oranges and mandarins on this rootstock should be avoided.** Fruit from trees on rough lemon roots is often coarse and usually of poor quality, lacking in flavour and juice.

Yuzu rootstock may have some promise in New Zealand for orange and mandarin varieties. It is susceptible to *Phytophthora* root rot and collar rot, but probably not to the same degree as sweet orange and rough lemon. It is also very deep rooting and appears to be more drought resistant than sweet orange. So little is yet known of the performance of citrus varieties on this rootstock in New Zealand that definite recommendations cannot be made at present.

Agricultural and Pastoral Show Dates

THE following are dates and venues of A. and P. shows up to the beginning of March:—

NORTH ISLAND

October

*18 and 19 October—Poverty Bay A. and P. at Gisborne.
*22, 23, and 24 October—Hawke's Bay A. and P. (Royal Show) at Hastings.

November

31 October and 1 and 2 November—Waikato A. and P. at Hamilton.
1 and 2 November—Wairarapa and East Coast P. and A. at Carterton.
2 November—Tokoroa A. and P. at Tokoroa.
6 November—Waikato Central A. and P. at Cambridge.
8 and 9 November—Whangarei A. and P. at Whangarei.
*8 and 9 November—Manawatu and West Coast A. and P. at Palmerston North.
9 November—Clevedon A. and P. at Clevedon.
15 and 16 November—Wanganui A. and P. at Wanganui.
*16 November—Bay of Islands P. and I. at Waimate North.
16 November—Waihi A. and P. at Waihi.
22 and 23 November—Rotorua A. and P. at Rotorua.
22 and 23 November—Egmont A. and P. at Hawera.
28, 29, and 30 November—Auckland A. and P. at Auckland.

December

*7 December—Helensville A. and P. at Helensville.
7 December—Kaikohe A., P., and H. at Kaikohe.
7 December—Hauraki A. and P. at Paeroa.

January

1 January—Nuhaka A. and P. at Nuhaka.
17 and 18 January—Feilding I., A., and P. at Feilding.
*17 and 18 January—Wairoa County A. and P. at Wairoa.
24 and 25 January—Horowhenua A. and P. at Levin.
25 January—Central Hawke's Bay A. and P. at Waipukurau.
*25 January—North Kaipara A. and P. at Paparoa.
29 January—Marton District A. and P. at Marton.
*31 January and 1 February—Rodney A. and P. at Warkworth.

February

1 February—Otorohanga A. and P. at Otorohanga.
1 February—Rangitikei A. and P. at Taihape.
6 February—Matamata A. and P. at Matamata.
7 and 8 February—Taranaki A. and P. at New Plymouth.
*7 and 8 February—Taumarunui and District A. and P. at Taumarunui.
8 February—Hukerenui A. and P. at Hukerenui.
8 February—Woodville A. and P. at Woodville.
11 and 12 February—Dannevirke District A. P. at Dannevirke.
12 February—Te Awamutu A. and P. at Te Awamutu.
*14 and 15 February—Ohura A., P., H., and I. at Niho Niho.
15 February—Waiapu P. and I. at Ruatoria.
15 February—Pahiatua A. and P. at Pahiatua.
15 February—Northern Wairoa A. and P. at Mititai.
21 and 22 February—Masterton A. and P. at Masterton.
*21 and 22 February—Te Kuiti and District A. and P. at Te Kuiti.
22 February—Putaruru A. and P. at Putaruru.
26 February—Morrinsville A. and P. at Morrinsville.
*28 February and 1 March—Wellington and Hutt Valley A. and P. at Trentham.

SOUTH ISLAND

October

19 October—Ellesmere A. and P. at Leeston.
26 October—Northern A. and P. at Rangiora.

November

*1 and 2 November—Timaru A. and P. at Timaru.
2 November—Amberley A. and P. at Amberley.
7 November—Ashburton A. and P. at Ashburton.
8 and 9 November—Marlborough A. and P. at Blenheim.
*13, 14, and 15 November—Canterbury A. and P. at Christchurch.
16 November—West Otago A. and P. at Kelso.
16 November—Taieri A. and P. at Outram.
20 November—North Otago A. and P. at Oamaru.
22 and 23 November—Nelson A. and P. at Richmond.
*23 November—Courtenay A. and P. at Kirwee.
23 November—Waimate A. and P. at Waimate.
23 November—South Otago A. and P. at Balclutha.
30 November—Motueka A. and P. at Motueka.

December

3 and 4 December—Gore A. and P. at Gore.
6 December—Wyndham A. and P. at Wyndham.
7 December—Otago Peninsula A. and P. at Portobello.
*10 and 11 December—Southland A. and P. at Invercargill.

January

11 January—Blueskin A. and P. at Waitati.
18 January—Waikouaiti A. and P. at Waikouaiti.
25 January—Waiau A. and P. at Tuatapere.
*25 January—Golden Bay A. and P. at Takaka.
28 and 29 January—Otago A. and P. at Dunedin.

February

1 February—Banks Peninsula A. and P. at Little River.
8 February—Palmerston and Waihemo A. and P. at Palmerston.
15 February—Murchison A. and P. at Murchison.
15 February—Inangahua A. and P. and Sports at Reefton.
22 February—Maniototo A. and P. at Ranfurly.

• The Department of Agriculture exhibit will be staged at this show.

Main Wool Sales

The dates and venues of main wool sales until the end of February are:—

23 and 25 October: Dunedin.
30 October: Christchurch.
8 November: Auckland.
13 November: Wanganui.
18 and 20 November: Napier.
25 November: Wellington.
4 December: Christchurch.
9 December: Invercargill.
14 December: Dunedin.
18 December: Timaru.
10 January: Wanganui.
15 and 17 January: Auckland.
22 and 24 January: Napier.
29 and 31 January: Wellington.
12 and 14 February: Christchurch.
19 and 21 February: Invercargill.
26 and 28 February: Dunedin.

Classification of Factory Supply Dairies

By M. H. WALLACE,
Assistant Director, Dairy Division, Department of Agriculture, Wellington

FROM discussions at farmers' meetings, at New Zealand Dairy Board ward conferences, in the Press, and finally at the Dominion Dairy Conference, dairy farmers will have received a general idea of the scheme for classification of factory supply dairies. Moreover, they will probably be aware that as a result of the recommendation of the Dairy Board, supported by the Dominion Dairy Conference in Wellington last June, it was decided to submit the proposal to trial during the coming season. The classification of supplying dairies (including milking plant) was therefore placed on a working basis (without penalty for "B" classification) from 1 August. Doubtless some confusion exists in the minds of dairy farmers as to how such classifications will be applied and into what condition the dairy premises will have lapsed before qualifying for a "B" classification. This article explains the situation and at the same time tries to allay the fears of those milk and cream suppliers who, despite lack of capital and labour, keep their sheds and machines clean and tidy.

SECTION 11-1 of the Dairy Industry Committee of Inquiry's report reads as follows:—

The Committee has agreed that some further financial penalty (completely apart from, and in addition to, milk and cream grading) on those few suppliers whose sheds and plant do not meet a desirable standard should be introduced, and accordingly recommends:—

(a) That in regard to the structural condition of milking sheds, the Dairy Division of the Department of Agriculture already has adequate authority and no alteration is necessary.

(b) That in regard to the hygienic standard of milking sheds and equipment, regulations should be sought for:—

(i) The classification of all supplying dairies into two categories "A" and "B" as from 1 August 1957, with those few dairies whose machines or general shed conditions do not meet the desired standards, but which can obviously be corrected by physical effort rather than capital expenditure, in category "B". This classification would in no way modify the powers of the Dairy Division of the Department of Agriculture in operating time limit notices or shed closures.

(ii) A penalty of 1d. per lb. butterfat, on supply from dairies classified in "B" category, on or after 1 August 1958, with a probationary period of 7 days in category "B" without penalty, but with only one such probationary period in any one season.

(iii) If, at the end of the probationary period of 7 days, the dairy is still classified "B", the penalty under paragraph (ii) to apply until the dairy is classified into category "A", but with a minimum penalty period of 30 days.

After full consideration of relevant submissions, the Committee does not recommend an independent appeal authority. The Committee considers, however, that if the penalty recommended in paragraph 1 (b) (ii) has been introduced, any supplier dissatisfied with the classification of his dairy should have the right to have the classification confirmed or amended by the District Supervisor or Instructor of the Department of Agriculture.

★ ★ ★

From the above it will be understood that the standard of cleanliness, rather than the structural condition of the milking premises, is of prior importance, and only where such standard is low and likely to jeopardise the quality of the milk or cream would a "B" classification apply or be imposed. In short, where honest endeavour is made to maintain satisfactory standards in the shed and milking plant, there should be no reason whatever to fear any reduction in classification or a penalty.

Classification Procedure

What classification will involve may be summarised as follows:—

1. For the present season no penalty is to apply to dairies classified "B" and the effectiveness of the scheme will be reviewed at the end of the dairying year.

2. Milking sheds and milking plants kept clean will be classified "A" and will remain in that category for the present season.

3. Milking sheds and machines **not** kept clean will be classified "B". In such cases the reasons why the dairy has been reduced in status will be pointed out by the Farm Dairy Instructor, who will also record them on the report form left in the dairy.

4. If owing to their insanitary condition the premises and plant are classified "B" for the first time in any one season, 7 days are allowed in which to remedy the trouble. If they are satisfactorily cleaned during that period, the classification reverts to "A"; if remedial measures are not satisfactory, the dairy remains in "B" category for a further 30 days.

Recommendation Accepted

The committee's recommendation that any supplier disputing a "B" classification should have the right to have such classification confirmed or amended by the district supervising instructor of the Department of Agriculture has been accepted.

If they are not already fully aware of the correct procedure or technique to be followed in keeping plant and premises in "A" grade, dairy farmers can be assured of the full co-operation and assistance of the Dairy Division's field staff.

Aim of Scheme

The aim is to encourage the production of clean milk, which is the basis of high-quality dairy products of all descriptions and which it is the duty of every dairy farmer to supply. Indeed with the dairy product markets of the world now well stocked no New Zealand dairy farmer can afford to disregard his responsibility to send off good milk or cream for manufacturing.

The scheme was inspired by the sure knowledge that the principal defects in quality of manufactured products are traceable to improperly washed and scalded milking plant, separators, cans, and buckets and perished machine rubberware.

It was felt by the Committee of Inquiry that only a comparatively small percentage of milking sheds would be placed in "B" category, but that their influence on the quality of the finished product would be disproportionately great. Further the welfare of the dairy industry now and in the years ahead depends on the quality of its manufactures, in the maintenance and improvement of which all concerned are expected to play their part.

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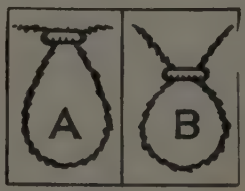

After placing ring on the purse DO NOT leave close to body as in sketch A.

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Tilting Stand for Honey Tank

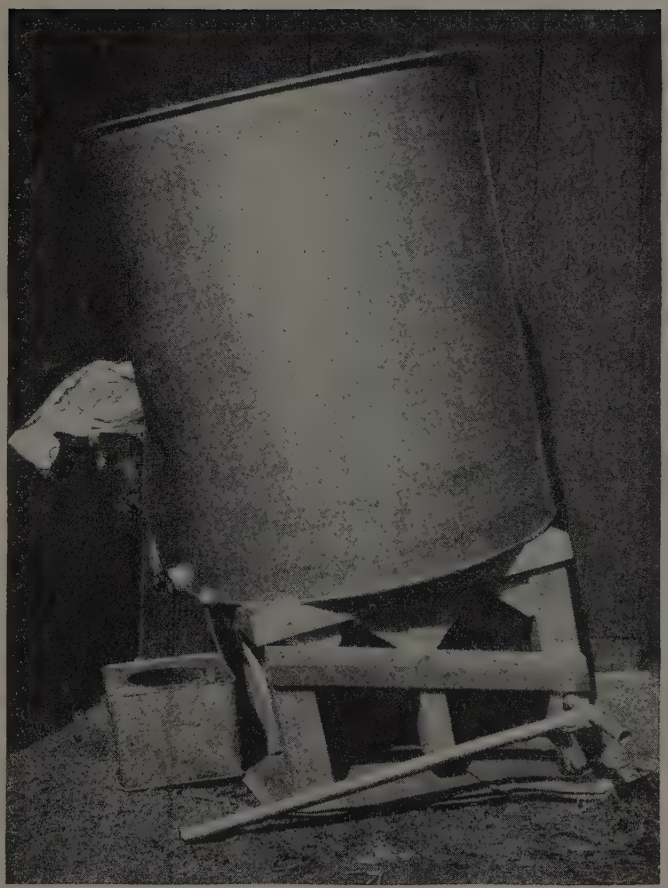
By D. ROBERTS,
Apiary Instructor, Department of Agriculture, Auckland

HONEY tanks generally are so constructed that they must be tilted before the last few gallons of honey will drain out. The honey tank stand fitted with the tilting mechanism described in the following article simplifies the draining of tanks and obviates the necessity for the use of wedges or blocks.

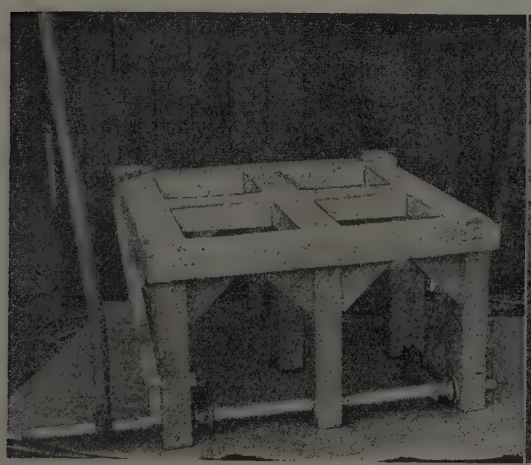
IN the extracting season beekeepers whose production per year is considerable must be constantly emptying their honey tanks. Because honey tanks generally cannot be completely emptied through the honey gates while vertical, they must be tilted forward and held in that position until empty. Though this does not usually need any considerable physical effort, it does take time and requires the use of wedges or blocks which may be lost or misplaced.

The Stand

The tilting stand devised by Mr. C. E. Gauthern, of Kerikeri Central, is simply constructed, effective, and easy to operate. The tank used by him is 2ft. 6in. in diameter and of 1100lb. capacity. The stand is 15in. high and 2ft. square, so that the tank projects beyond the stand by 3in. in the middle of each of the four sides. The tank is prevented from sliding forward when tilted by two small wooden blocks nailed to the front corners of the stand.



The tank tilted for draining.



The stand in the normal position.

The stand fully tilted, showing the construction.

HONEY TANK STAND . . .

The stand should be substantial to withstand the strain of tilting. Mr. Gauthern's stand is built entirely of 3in. x 2in. timber. Nine legs are fitted, each of which is braced to the top bearers by angle pieces. Outside diagonal braces are fitted to the two sides, making the stand very rigid.

Tilting Mechanism

The material needed for the tilting mechanism suitable for a stand of this size is: Two pieces of ¾in. galvanised water pipe, one 28in. long and one 36in. long; four pieces of strip steel 3/16in. thick, 2in. wide, and 7in. long; two used ball or roller bearings of 2½in. outside diameter; two ¾in. bolts and nuts; and welding or brazing material.

The mechanism is assembled and welded or brazed together in place on the stand. First, holes to provide a free fit for the 28in. piece of pipe are bored in the rear legs of the stand. These holes are 2in. from the bottoms of the legs. Holes of a size to take the pipe as a neat fit are then bored in one end of each of the four steel strips. At the other end of the steel strips a ¾in. hole is bored. The pipe is threaded through the legs and at the same time through the pieces of steel strip. These are then welded to the pipe in pairs just inside each outer leg. The strips then form a pair of arms into which are bolted the bearings to form rollers. The spacing between the individual members of each arm is ¾in. The fixing of the arms just inside the two outer legs prevents any undue side movement of the tilting mechanism when it is in operation.

To form an operating lever the 36in. piece of pipe is then welded to the projecting end of the pipe carrying the rollers. When the lever is being welded or brazed in place it should be strengthened at the point of attachment by a piece of steel strip. The arms carrying the bearings should be so positioned on the bottom piece of pipe that when the lever is vertical they lie underneath the stand and are parallel with the floor. Moving the lever from the vertical position forward to the floor will raise the rear of the stand sufficiently to provide rapid drainage of the tank. Before the lever is attached to the lower pipe it should be offset sufficiently to clear any part of the tank which may project beyond the stand.

Radio Broadcasts for Farmers

RADIO broadcasts for farmers will be given during November as follows:—

1YA Auckland, 7.45 p.m.

6 November—Talk by officer of Animal Industry Division, Department of Agriculture, Auckland.

13 November—"News from the Grasslands Conference", by J. E. Bell, Fields Superintendent, Department of Agriculture, Auckland.

20 November—Talk by officer of the Animal Industry Division, Department of Agriculture, Auckland.

27 November—"Summer Pasture Management and Topping", by D. M. E. Merry, Instructor in Agriculture, Department of Agriculture, Pukekohe.

1XH Hamilton, 12.33 p.m.

11 November—"Disease Control by Vaccination", by D. W. Caldwell, Veterinarian, Department of Agriculture, Hamilton.

18 November—"Problems of Silage and Haymaking", by J. D. Currie, Instructor in Agriculture, Department of Agriculture, Hamilton.

25 November—"Scientific Farming and Some of Its Problems", by J. Bayley, Federated Farmers, Hamilton.

2XG Gisborne, 8 p.m.

5 November—"Stockowners' Question Time", by E. B. Smythe, Livestock Instructor, Department of Agriculture, Gisborne.

1YZ Rotorua

13 November (7.15 p.m.)—"Sheep Lice and Sheep Dipping", by E. O. Pederson, Livestock Instructor, Department of Agriculture, Whakatane.

27 November (12.33 p.m.)—"The Value of Pig Carcass Competitions", by S. W. Rees, Supervisor, Bay of Plenty District Pig Council.

27 November (7.15 p.m.)—"Hygienic Production of Milk and Cream", by A. T. Gabolinscy, Special Inspector, Department of Agriculture, Hamilton.

2XA Wanganui, 8 p.m.

7 November—"For the Country Woman", by Mary MacDonald.

14 November—"The Radio Vet.", by S. Jamieson, Veterinarian, Department of Agriculture, Wanganui.

21 November—Talk by C. M. Bailey, Supervisor, Taranaki District Pig Council.

28 November—"Insecticides on the Farm", by A. A. Duncan, Instructor in Agriculture, Department of Agriculture, Wanganui.

2ZA Palmerston North, 12.33 p.m.

4 November—"Wool", by H. P. Turner, Sheep and Wool Instructor, Department of Agriculture, Feilding.

11 November—"Summer Pasture Management", by L. W. Blackmore, Instructor in Agriculture, Department of Agriculture, Dannevirke.

18 November—"Vegetables—from Grower to Consumer", by J. B. Laurenson, Horticultural Inspector, Department of Agriculture, Palmerston North.

25 November—"Preparation for Irrigation", by J. O. Brasell, Farm Machinery Instructor, Department of Agriculture, Palmerston North.

2YZ Napier, 7.10 p.m.

5 November—"Farm Management in Hawke's Bay", by G. M. Bennett, Fields Instructor, Department of Agriculture, Hastings.

19 November—"Seed Certification", by F. H. Collin, Instructor in Agriculture, Department of Agriculture, Hastings.

3YA Christchurch, 12.20 p.m.

4 November—"Diseases of Livestock", by A. C. Howse, Veterinarian, Department of Agriculture, Christchurch.

18 November—"Review of 'The New Zealand Journal of Agriculture'" (November issue), by E. G. Smith, Instructor in Agriculture, Department of Agriculture, Rangiora.

4YA Dunedin and 4YZ Invercargill, 12.33 p.m.

4 November—"Weed Control in Brassicas", by R. Stephen, Instructor in Agriculture, Department of Agriculture, Balclutha.

11 November—"Harvesting Equipment", by L. H. Weston, Machinery Instructor, Department of Agriculture, Dunedin.

18 November—"Lamb Management", by K. G. Gray, Livestock Instructor, Department of Agriculture, Invercargill.

25 November—"Spelling of Tussock Grassland", by J. M. Hercus, Instructor on Agriculture, Department of Agriculture, Alexandra.

4YZ Invercargill (following joint programme from 4YA and 4YZ)

4 November—"Winton Experimental Farm", by W. Faithful, Instructor in Agriculture, Department of Agriculture, Invercargill.

11 November—"Handling Lambs", by H. A. Cato, Supervising Meat Inspector, Ocean Beach.

18 November—"Soil Conservation in Southland", by W. O. Sly, Assistant Soil Conservator, Department of Agriculture, Invercargill.

25 November—"Seasonal Stock Problems", by K. McDonald, Livestock Instructor, Department of Agriculture, Otautau.

Regular Sessions

1XH Hamilton, Mondays at 12.33 p.m. and Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (stock sale review).

1XN Whangarei, Mondays at 8 p.m. (Northland livestock report and "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 8 p.m. ("News for the Farmer").

1YA Auckland, Mondays at 12.33 p.m., Tuesdays, Wednesdays, and Thursdays at 7.45 p.m., and Fridays at 6 p.m. and 7.45 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock market review), Tuesdays at 7 p.m. (Hamilton stock market report), Wednesdays at 7.15 p.m. (Pig Council talk on fourth Wednesday of every other month at 12.33 p.m.), Thursdays at 12.33 p.m.

2XA Wanganui, Wednesdays at 8 p.m., (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m., Fridays at 8.2 p.m. (Gisborne stock market report).

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8.1 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawke's Bay orchardist session), Tuesdays at 7.10 p.m., Wednesdays at 7.15 p.m. (Hawke's Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Mondays at 8 p.m. (Pleasant Point stock market report), Tuesdays (fortnightly) at 8 p.m. (Temuka stock market report), Wednesdays at 8 p.m., and Saturdays at 10.30 a.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Mondays and Thursdays at 12.33 p.m.

4YA Dunedin, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m., Wednesdays at 12.33 p.m. and 6.50 p.m. (Burnside stock market report), Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m. and 7.15 p.m. (Lorneville and Gore stock market reports), Wednesdays at 12.33 p.m., and Thursdays at 12.33 p.m.

Growing Plants in Boxes and Tubs

WINDOW boxes and tubbed plants are frequently used for special celebrations in towns and cities. They can, however, be used as features everywhere; they will brighten city blocks of offices and flats, and in suburban and rural districts they can be used to unite the house with the garden. In this article K. H. Marcussen, Horticulturist, Department of Agriculture, Christchurch, describes how boxes and tubs should be prepared and outlines the attention required for a satisfactory display. The garden work notes for November are by Rosalie A. Campion, Horticultural Instructor, Department of Agriculture, Wellington.

WINDOW boxes are particularly popular in northern European countries. In cities where large blocks of flats predominate they can often be seen either at windows or on the balconies which are a common feature of modern architecture. Often they are planted up in pattern, in the same manner as bedding displays in parks, and they certainly make an attractive show. Owing to climatic conditions they are a summer feature in northern countries, and because the temperatures seldom become as high as in New Zealand the range of suitable plants is greater and the displays longer lasting; this last factor may also partly be due to the less windy conditions in these countries.

With the aid of plants growing in boxes and tubs many flat roofs and terraces are made garden-like. To the tourist this type of decoration is probably best known in the street cafes, where flowering plants, small trees, and even screening hedges are all grown in movable containers.

With the gradual development of "outdoor living" in New Zealand, this type of plant culture will become more popular. Many new houses now have large concrete or stone terraces which may reflect the sun and become too hot. Suitably placed shrubs or trees in tubs provide some shade and provide contrast to large areas of concrete or stone.

Containers

Containers and their attachments should always be made strongly and of durable materials; otherwise accidents may occur. When boxes are slung on the side of a building brackets of steel or galvanised pipe are the best. If boxes are placed on the outside window ledge, slats of wood should be put under them to preserve the timber.

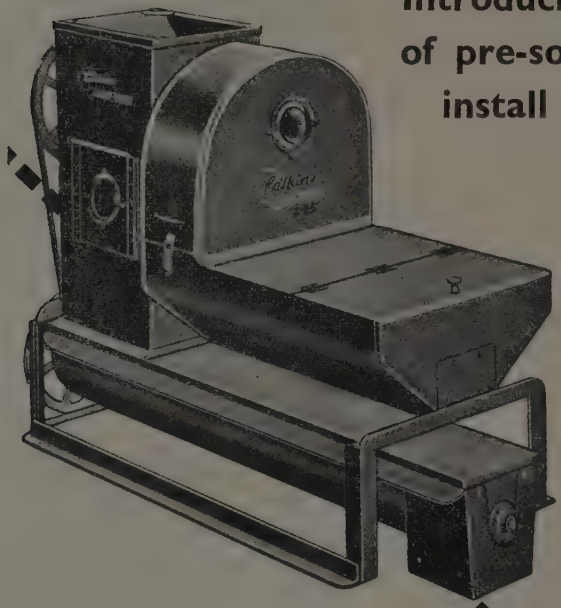
Boxes and tubs can be made of galvanised iron or of hardwood timber; the former, being less weighty, are easier to handle. When boxes are made of wood it is preferable that they be dovetailed for greater strength. If that is not done, screws should be used; nails should not be trusted for such a job.

Adequate drainage should be provided. In wooden containers sufficient holes should be made to allow water to escape freely, even if some boards warp; this frequently occurs with tubs.

[*Sparrow*

▲ Dwarf conifers make ideal tub plants and can be kept in perfect condition for many years.

▼ Fuchsias in boxes and tubs are a striking feature at the entrance to this home.



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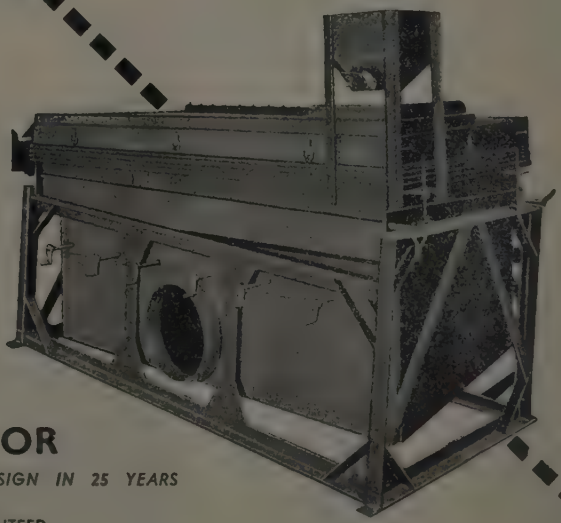

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Timber should be treated either with a wood preservative or painted. Wood preservative is the better on inner surfaces, as paint tends to peel after being subjected to soil moisture for a period. If creosote is used, the timber should be allowed to weather for a few weeks before planting up. This is especially important if smaller plants, such as bedding plants, are used, as they can be killed by the escaping fumes.

Sometimes permanent boxes of brick or concrete are made when a house is built. It is important that drainage outlets be provided in such boxes and that a good layer of drainage material be placed beneath the soil. These containers should be treated in the same manner as other containers to obtain a good display year after year.

Four-gallon tins which have been partly cut down can be used for short-term crops or for growing trees or shrubs while they are small. By the time the tins have rusted the plants will generally be big enough for larger tubs.

Sometimes loose boxes are placed inside a permanent structure. The main advantage is that duplicate sets of boxes can be used, the plants in one set growing on so that they are at their best when the plants in the other set are deteriorating. In this way a display can be obtained over a much longer period.

Where boxes are used outside windows allowance should be made for the growth of plants. It may look well to see the plants and flowers from the inside, but it can be annoying not to be able to open the windows.

Choice of Plants

The position for the boxes or tubs, and the length of time they are expected to remain showy, will largely determine the type of plants which should be used.

For short-term decoration (for example, to celebrate a family event) any showy plants can be used provided they can be relied on to flower at that particular time; good subjects for summer use would be geranium, nasturtium, petunias, *Phlox drummondi*, and fibrous-rooted begonias.

When containers are intended for such a special purpose it may be preferable to place them in some sheltered position in the garden after they have been planted up. Apart from better growing conditions the plants can perhaps be given more attention and training, resulting in a better display when the containers are eventually placed in the position for which they have been prepared.

If flowering plants are required for a long period, a duplicate set of containers can be used as mentioned previously or replacements can be made with pot-grown plants kept ready for the purpose.

▲ Geraniums in window boxes are always colourful.

▼ Mesembryanthemums are useful for all-the-year planting in window boxes.

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Evergreen plants, both broad-leafed and coniferous, are suitable for all-the-year display, and if smaller plants are required, succulents can be used.

Shrubs and trees are particularly useful for tubs and will last for many years. If conifers of a type suitable for decorating as Christmas trees are used, the annual problem of providing a Christmas tree is overcome and it is quite interesting to watch the Christmas tree grow.

Some of the flowering shrubs also make excellent tub plants; hydrangeas and fuchsias are quite common, and many others can be used.

Screens can be made by growing climbers in boxes fitted with a trellis. For the street cafes mentioned earlier ivy is used extensively for this purpose, but other climbing plants would be suitable also.

Preparation and Planting

The best soil available should be used for plants in boxes and tubs. The ideal is turf which has been stacked for 6 months and is partly rotted down, particularly if it has been sandwiched with animal manure. Otherwise, the best soil from the garden should be used, mixed with well-rotted animal manure or compost; coarse sand should also be added to keep the mixture open. The amount of each will vary according to the texture of the soil, but the John Innes formula recommended for indoor plants last month will be a guide. A double or treble amount of the fertiliser recommended, according to the time the plants are expected to remain in the soil, should be added.

A layer of rubble, rough stones, or crocks should be placed in the bottom of the container to assist drainage. On top of this can be placed a layer of coarse, but rich, material; some of the soil mixture can be used with additional animal manure or compost plus sand. This layer is of special value when permanent plants, such as trees and shrubs, are to be planted, as they will benefit from the additional plant food later.

The container should be filled with the soil mixture, which for planting should be moist enough for uniform packing round the plants. A simple test is to squeeze a handful; it should keep the shape but break up easily when touched.

For small plants the soil should be firmed well before planting, but for larger specimens, particularly in tubs, the soil should be packed round the roots by ramming; for this a short length of broom handle is excellent.

To facilitate watering the containers should be filled to within an inch or so of the top; they should never be filled right to the top.

When trees and shrubs are planted the containers should have less soil to allow for an occasional topdressing of animal manure or compost later.

Turf, which has been stacked for 6 months partially to rot down, is ideal for tubs and boxes.

Care after Planting

Special care should be given to all plants the first few weeks after planting. They should be kept moist, but not excessively wet. If possible, they should be protected from strong winds and scorching sun, and when the atmosphere is dry light damping down of the foliage is beneficial.

This applies equally to plants in boxes and tubs. When the containers are planted up in their permanent positions, where the plants are more exposed to the elements, everything possible should be done to assist them in becoming established.

If the containers are movable, it is a good practice to keep them in a sheltered position, as mentioned above, for a few weeks.

General Care

When plants have been put into good soil in properly drained containers and have been given a good start they require little attention, except watering, during the first month or two.

Water should be given when necessary by a thorough soaking of the soil. After that the plants should be left until the soil is moderately dry again. While the plants are small such watering will not be required very often, except if hot and dry winds prevail, but the need for water will increase as the containers become filled with roots.

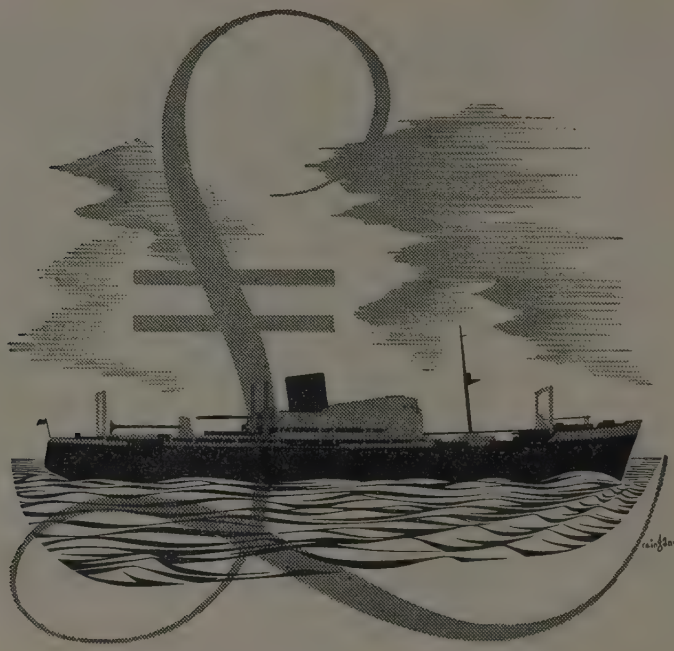
Some training will be required. Small stakes may be needed to support the plants and possibly for directing the growth to obtain the best effect. Other shoots may need to be stopped by having the growing point pinched out to promote branching and development of more compact plants.

Quick-growing subjects, such as flowering bedding plants, may slow up in growth a couple of months after planting. They may have exhausted the food supply which was readily available and it may be an advantage to begin supplying additional fertilisers. This should, however, be done judiciously.

If flowering plants are kept growing too strongly, they may develop too much foliage without producing flowers. Such plants should not be fed and the soil should be kept fairly dry. If, however, the plants indicate that additional plant food is required, the usual fertiliser mixture for side dressings of flowering plants can be applied. This consists of 3 parts (by weight) of dried blood, 2 parts (by weight) of superphosphate, and 1 part (by weight) of sulphate of potash, and can be given at 2oz. per square yard of soil surface.

The required amount can also be dissolved in a watering can and applied as a liquid.

The soil should be moist before the application and preferably loosened slightly.



What happens to every pound we earn

Everybody knows that money needs managing. That's why most of us are interested to hear how other people manage theirs. But, whether you're dealing with hundreds of pounds or with millions, the problems are basically the same; it all comes down to shillings and pence in the end.

Shipping finance is no exception. This is what happens to every £ we earn in the way of freight and passage money.*

We spend on Fuel	1s. 11d.
Port Charges come to	1s. 6d.
Insurance of ships, crews and cargoes cost	10d.
Food, provisions and stores come to	1s. 3½d.
Labour and services—which includes, not only wages for the crew, but the costs of cargo handling, ship repairs and general maintenance	11s. 3½d.

The original pound has already been reduced to 3s. 2d.—and only the actual operating expenses have been paid so far. We can however at this point take in a small item for miscellaneous income (from investments and so on). The amount is 7d. That gives us 3s. 9d. in hand—but not for long.

To recover the original cost of our ships we set aside as Depreciation the sum of	2s. 0½d.	
. . . *but* costs of replacement continue to rise steeply and to make some provision for this we put aside an additional	6d.	2s. 6½d.
Taxation takes		11½d.
To the Shareholders we pay a dividend of		3d.

. . . *and that's it.*

Close budgeting indeed!

More than three-quarters of the expenditure goes on actual operating expenses, over a considerable part of which the Lines have virtually no control. There is, in consequence, little room for economies and adjustments. A small increase can possibly be absorbed, but if the shipping service is to continue then any substantial increase in costs (or a continuing small one) can only be met by increased charges for our services. There is no other way to balance the budget.

*(*Figures quoted from the accounts of one of the New Zealand Overseas Lines over the six-year period ending September 1956*)

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Liquid fertilisers made from animal manure would be suitable also.

Troubles

Because plants grown in containers usually are situated in more conspicuous places than when grown in flower beds or borders, more attention is often given to the removal of dead flowers and foliage, and this is an important aspect of their cultivation. These plants are grown in the open and are subject to most insect pests and diseases present in the garden; any dead plant material will accentuate trouble.

The usual control measures appropriate for the plant in the form of sprays or dusts should be used.

Red mite can be particularly troublesome. Because the plants are more isolated the atmosphere around them tends to be dry; under such conditions this pest thrives. If the nature and growth of the plants will allow it, an occasional hosing down is beneficial, especially if the jet is directed so that the undersides of the leaves are washed clean. If mites are present, this treatment will often remove many of them; otherwise, a suitable insecticide should be applied. Malathion, which has proved useful for the control of many pests in the flower garden, is effective for the control of mites when two or three applications are made at 10-day intervals. It should be mixed according to the manufacturers' recommendations.

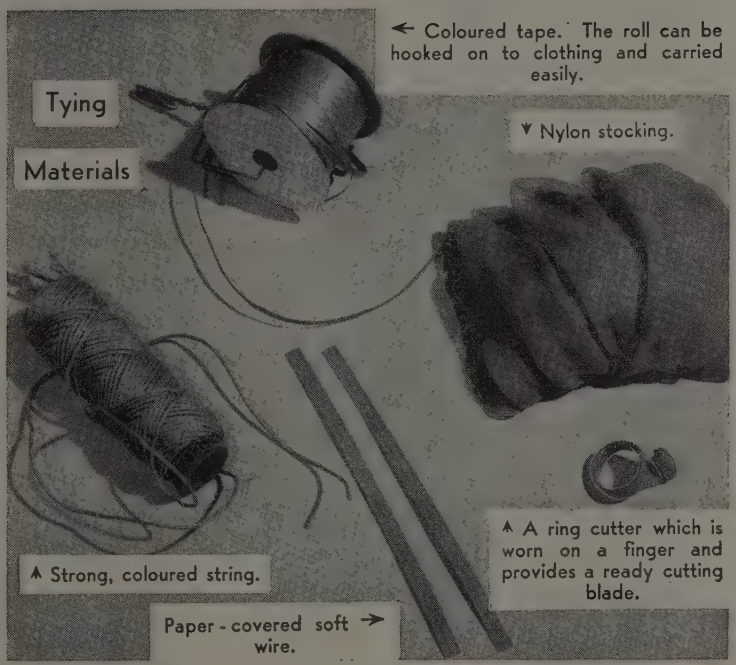
Work for November

November is a busy time in the flower garden. Two of the main tasks are to keep up with luxuriant growth by tying and the destruction of weeds as they develop.

Staking of Plants

Staking of plants is often necessary, but with care the ties and stakes can be made fairly inconspicuous. Green raffia tape or string, strips of old nylon stockings, or paper-covered soft wire are satisfactory tying materials. Where much tying is to be done the use of a ring cutter, shown on this page, will save time, movement, and searching for scissors.

Plants should be supported in accordance with their growth habit. No attempt should be made to tie up plants such as geums, which naturally sprawl and give light ground coverage. Plants such as heleniums and michaelmas daisies, which have many strong basal shoots, should be encouraged to radiate their growths from ground level by the careful placing of stakes. This is preferable to using one stake to each clump and bunching the plant with one tie.


Tying
Materials
← Coloured tape. The roll can be hooked on to clothing and carried easily.
Nylon stocking. ↓
↑ A ring cutter which is worn on a finger and provides a ready cutting blade.
↑ Strong, coloured string.
Paper - covered soft wire →

Short, twiggy pieces of silver birch or brushwood can be placed among the growths of smaller herbaceous plants which will then grow up through them, thus receiving sufficient support. Delphiniums and hollyhocks require special assistance, and in very windy areas stakes for individual blooms will be necessary. To avoid a display of tall, bare stakes throughout the growing season a few shorter stakes should be used first, these being replaced when necessary by taller stakes. Bamboo stakes give excellent support for this type of growth and in large gardens a permanent clump of bamboo in an unused area is a great asset. The large stakes may be used for the larger plants and small stakes and twigs are suitable for light plants such as aquilegia.

Lifting of Bulbs

Transplanting of bulbs when the beds are required for summer bedding was mentioned in last month's notes. When the leaves have died down completely, but not before, bulbs may be lifted for division. Where soil conditions are suitable many bulbs, such as narcissi, tulip, and ixia, need not be lifted and divided unless the blooms show deterioration.

The bulbs can be dried in the open but protected from direct sunlight for several days before cleaning and storing. Any diseased bulbs or those which feel soft from the presence of bulb fly should be destroyed by burning. They are a menace if put on the compost heap where pests and diseases may breed freely. The bulbs should be stored until they are planted in a dry, airy, but not draughty place where temperatures do not fluctuate greatly.

To prevent infestation by insect pests during storage a dusting with lindane (2 per cent.) can be given and a dusting with thiram (5 per cent.) will assist in preventing spread of fungous diseases. These dusts can be combined in one application.

Planting

The planting of chrysanthemums and dahlias should be concluded by the end of November. Later planting does not give time for the plants to develop to their full beauty. Except for those varieties which are desired for Easter flowering, most gladiolus should be planted by the end of November. Successional planting will give continued blooms over the summer, when they make excellent cut flowers.

The planting of annuals should be continued so that short-lived types such as nemesia and candytuft may be replaced as they pass their best blooming. Where gaps are evident in mixed borders a few annual seeds may be sown for late summer blooming.

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Marathon
BY SKELLERUP

GUMBOOTS

Air layering by the use of polythene film, showing the position of the layer.

"Magic carpet" mixtures are useful in such places.

Seasonal Seed Sowing

During November and December sowing of the more permanent plant materials can be made. Where shrub or tree seeds are being sown it is preferable to sow them in pots or boxes because many of these take a long time to germinate and may easily be lost in an open bed. Seeds which have a hard seed coat should be chipped or rubbed in coarse sand to allow the entry of moisture. Where great difficulty is experienced, boiling water should be poured over the seed and the seed before sowing allowed to soak in the water as it cools.

Good results will be obtained by sowing the seed now of plants such as sweet william, wallflower, honesty, and forget-me-not, which develop into strong young plants the first season, winter well, and then grow on to maturity and flower during next spring and early summer. In the warmer districts brompton stocks sown now will give valuable picking material throughout next winter.

Many perennials may be multiplied by sowing selected seed now. This is a simple method of increasing supplies of plants such as coreopsis and lupins. Seed of some excellent new strains is now available.

Ground layering is a satisfactory and simple method of propagation.

Layering of Shrubs

November is a satisfactory time for the layering of such trees as magnolias, rhododendrons, lilac, and rhus. It is desirable that plants to be ground layered should have healthy, vigorous growth near ground level. The soil should be broken up to make a hole 4in. deep beneath the branch to be layered. A slanting cut should be made on the upper side of the branch to be layered, about 12in. from the tip. This cut may be treated with a suitable hormone to aid rooting. Bend the shoot upward at right-angles to the original and place the angle in the hole. Fill in the hole with a mixture of sand, soil, and compost in equal quantities. After 1½ to 2 years when the branch has developed strong roots it can be cut from the parent and transplanted to its permanent position. This is a satisfactory and simple method of propagation for home gardeners and many other plants could be treated in this manner.

Air layering has become so simplified by the use of polythene that home gardeners using this method, with little experience, can become quite efficient with it. If an area of the branch is slightly injured to induce rooting, hormones may be applied to the damaged tissue, which should then be surrounded by slightly moist sphagnum moss. A sheet 1ft. long of plastic film is firmly wound around the area and secured. Because

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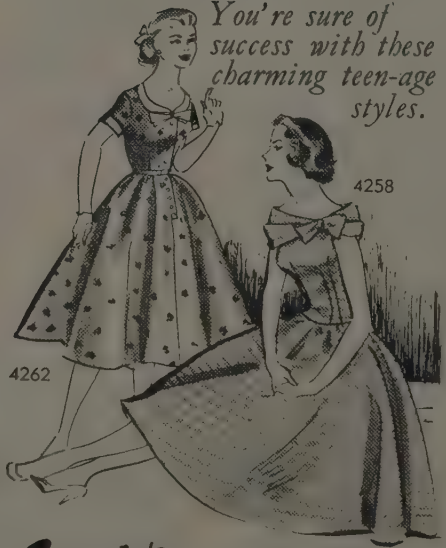


Academy Patterns

New Season's Catalogue now on display.

polythene will allow the passage of air but not of moisture, the rooting area will remain healthy and moist. When roots become visible within the polythene the branch may be removed from the parent, the polythene removed, and the new plant set out in a shaded position.

Control of Grass-grub in Lawns

Where the presence of grass-grubs was indicated by the dying out of patches and sponginess of the lawn in autumn treatments should be carried out before mid-November. The grass-grub pupae will remain dormant in the soil during winter and in spring about October the adult insects commonly known as brown beetles will emerge to feed on the leaves of trees. During the day they shelter in the turf and lay eggs. It is to destroy the young grubs which develop from these eggs during the late part of this month that treatment must be carried out. Water on to the lawn 1¼oz. of 20 per cent. wettable DDT powder to 10 sq. yds. A new material, aldrin, should prove of value in controlling grass-grubs.

Lawn Weeds

Where regular applications of a mixture of sulphate of ammonia and superphosphate are made to lawns flat weeds will give little trouble. If flat weeds and clovers persist, 1 fl. oz. of MCPA and 2 fl. oz. of 2,4,5-T to 100 sq. yds. will give excellent control.

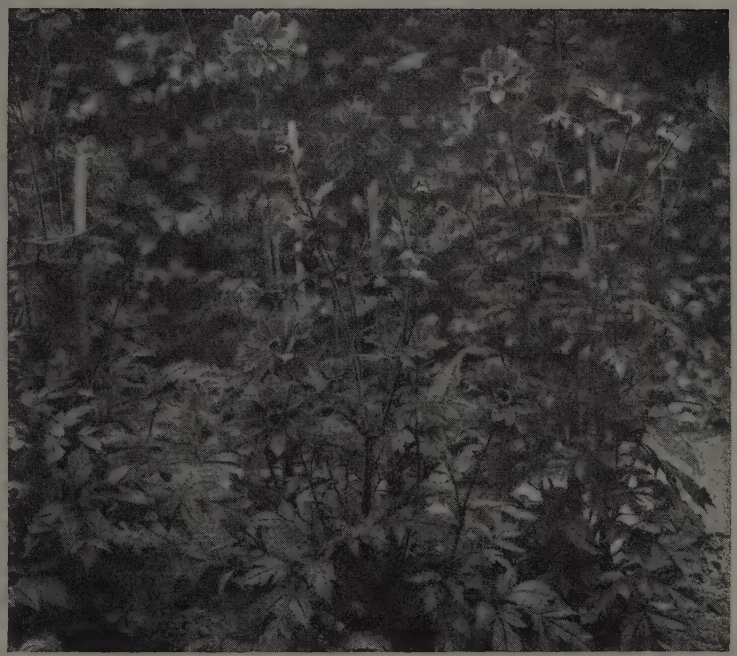
Control of Wild Onion

Wild onion has become a troublesome weed in many areas and every attempt should be made to eradicate it. It can be controlled by applying oil-soluble esters of 2,4-D, but repeated applications are necessary to kill successive crops of germinating bulbils. The first application should be made this month and another application should be made at the same time next year.

The esters of 2,4-D can be used at 1 fl. oz. to 40 sq. yds. Though they are all mixed with water to assist spraying, the addition of diesel fuel adds to their effectiveness. When weeds are 4in. to 6in. high for every 19 parts of water 1 part of diesel fuel should be used. If the weeds are not sprayed at the correct time, but are left until flowering, the whole quantity of water should be replaced by diesel fuel.

The Use of Hormone Weedkillers

Hormone weedkillers such as 2,4-D, 2,4,5-T, and MCP should be used with care in the home garden because of the danger of drifting spray which may affect neighbouring plants. For this reason they should be used only early in the morning or very still days. **It is particularly difficult to remove traces of hormone weedkillers from spray equipment and it is advisable to have a separate spray pump to be used only for weedkillers.**



Staking can be effective yet inconspicuous as is shown with this single variety of dahlia Bishop of Llandaff.

Removal of Flower Heads

As the bloom period of many plants passes, the plant puts its energy into producing seed heads and unless seed is required, the dead heads should be removed after flowering. Shrubs such as rhododendrons, azaleas, camellias, and ericas require this attention, which is usually all the pruning they require.

Pansies, violas, gaillardias, sweet peas, and Iceland poppies can be induced to flower longer if the flowers are removed regularly. A light top-dressing of a general fertiliser could be applied now to those plants which have been flowering for some time.

General

Where show blooms are required some disbudding of roses should be done immediately. Keep a close check for fungous diseases and pests and apply the appropriate sprays.

All climbing plants should be watched to see that they have a support on which to develop. On those which are not self-supporting, tying should keep pace with the growth.

Under glass, cuttings of tuberous begonias should now be taken cleanly and placed in clean, moist sand to root. A few flowers can be expected from these late in the season.

Cyclamen plants will have finished blooming by now and should be rested over the summer. They should not be allowed to go completely dry and thus become dormant, but should retain some foliage throughout the summer. This will necessitate occasional watering.

Many hedges will now be ready for their first spring cut. These soft young prunings can be added to the compost heap. By Christmas the further growth will be sufficient to make the hedge attractive during the holiday period.

Cuttings of rock garden plants may now be taken to replace those plants which are nearing the end of their usefulness. Rooting will be strongest in a coarse, gritty material in a cool position.

The seedlings of cacti and succulents should be watered occasionally, preferably in the morning. Though cacti and succulents are specially adapted to grow where the water supply is restricted, they respond well to moderate summer waterings provided the drainage is satisfactory.

Annual plants which are slow in growth may be suffering from starvation. Liquid dressings of animal manure or nitrate of soda will encourage growth. If annuals are becoming leggy, the tops should be nipped out to induce vigorous, bushy growth.

By CHRISTINE LYONS,

Home Science Extension Officer, Department of Agriculture, Auckland

AS with all household equipment there are good and poor floor coverings and, because most of them are expensive, the necessity for buying from a reputable firm cannot be over-emphasised. Some factors to take into consideration when buying carpets and other types of floor coverings are discussed in this article.

THE choice of floor coverings is a personal matter, but because they are such a long-term investment, it is essential first to choose patterns and colours that will remain pleasing to the purchaser for many years. Though curtains, loose covers, and cushions are far less expensive to change, carpets will usually outlast these. It is advisable therefore to have floor coverings which will harmonise with a variety of complementary colours.

Remember, too, that floor coverings can seemingly alter the size of a room; for instance, a small room can be made to look even smaller if the carpet has a large pattern. On the other hand, if a plain or mottled type of carpet is used, a room has a much less cluttered look and this, in itself, gives the illusion of a larger room.

If a boldly patterned carpet is chosen, a more pleasing effect will result if most of the other furnishings (curtains, loose covers, and cushions) are plain. If a plainer pattern is used, there will be much greater scope for the other furnishings.

Types of Floor Coverings

The following are the types of carpets and other floor coverings generally available in New Zealand:—

Wilton and Axminster

The names Wilton and Axminster refer to the type of weave, not as is often thought to a particular make of carpet. Both come in a variety of qualities, which are determined by the length and quality of the pile, the number of rows of tufts (shots) to the inch, and the pliability of the backing.

For general home use Axminster is the more satisfactory. Suitable Axminster grades are AO, A1, and blended pile. AO is the highest Axminster grade, as it has more shots to the inch and because of this is considerably more costly than the other grades. A1, if properly cared for, will give many years of good service. Blended pile is half wool and half rayon. It is much less costly than A1 and has a similar appearance, but its quality is by no means equal to that of A1.

There are several Wilton grades suitable for home use, the most popular of which is W4. However, it comes only in plain colours and is more expensive than A1.

Haircords

Haircords are slightly cheaper than A1 Axminster. Most of the haircords so far available have been in a plain weave, but recently striped, mottled, and patterned haircords have been appearing and are an improvement, as they do not show marks so readily.

Haircords are made from synthetic materials or from a mixture of hair and synthetics, their wearing qualities are quite good, and they are 27in. wide.

Felted Floor Covering

Felted floor covering is available in wider strips, usually 72in. It can be bought in plain or mottled shades, the latter being slightly more expensive. They are probably better used in bedrooms or rooms where there is not continual and heavy traffic.

Needleloom Floor Covering

Needleloom floor covering is a comparative newcomer among flooring materials and is a relatively inexpensive way of covering floors. Most of

the needleloom coverings have very little wool content and because of this are not entirely satisfactory. However, one firm is producing an all-wool product 6ft. wide, and this is a good buy for a cheaper type of flooring.

This type of floor covering is not woven; it is needled on to a rubberised jute backing—hence its name. It does, however, tend to stretch or shrink, owing to changes in atmospheric conditions and this point must be remembered if it is to be used wall to wall.

Needlelooms are usually in widths of about 5ft. Those made from synthetic and vegetable fibres tend to become shabby in a comparatively short time and are better used in rooms where traffic is not heavy.

Tufted Carpets

Tufted carpets are also comparatively new in New Zealand, but are likely to become popular. At present they are being manufactured in rayon. They have an attractive appearance somewhat similar to that of the old Chenille-type weave, which incidentally is now virtually unobtainable.

At present tufted carpets are obtainable only in plain colours. An underfelt is not essential with this type of carpet.

Fibre Matting

Fibre matting is now available in various widths and in attractive colours. Underfelt, though not essential, is recommended. Because fibre matting can be washed, its best use is for children's rooms or sunrooms.

Indian and Persian Carpets

Indian carpets are available mainly in squares or rugs; they are all hand-woven and a much coarser type of wool is used. Do not when buying an Indian carpet purchase a cheap one; good ones are well worth the extra expense.

The true Persian carpet could be termed a collector's piece. They are exquisitely hand made from beautiful materials and will give a lifetime of wear under normal conditions. As these carpets are completely hand knotted, only a few inches can be completed in a day. They are very often the work of one family and authorities on carpets are able to tell where one member of the family finished his part of the knotting and another began.

Underlay

Underlay is not essential for every type of floor covering, but it is beneficial in all cases. The two main reasons are that it will prevent bruising of the backing of a carpet by the hard flooring and make it longer wearing and it gives a more luxurious feel when the carpet is walked on.

Various grades of underfelt 72in. wide are available. Hessian lined is the most common and the least expensive and it is perfectly satisfactory. Two thicknesses of this are available. The thicker, more expensive one gives greater resiliency.

Cowhair is another variety, but is dearer than the thicker-grade hessian.

Finally, there is rubber foam or plastic foam underlay. For best results a layer of standard hessian should be used on top of this. If the cost can be faced, the "up to the knees in carpet" result is well worth the added expense.

An effect of spaciousness is given to this room by a plain carpet and attractive use of contrast supplied by the patterned loose covers.

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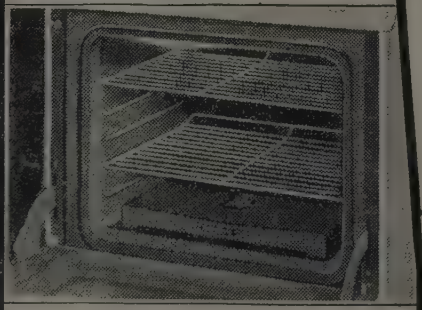

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Materials Used in Carpet Making

All carpets were once made of wool; nowadays rayons are being used quite extensively, but it is advisable if buying rayon carpets to make inquiries about colour fastness. Rayon carpets have one particular advantage in that they are not subject to attacks from moths and carpet beetles to the same extent as are woollen carpets. They do, however, soil very readily.

Nylon carpets are becoming very popular in America, though they have not yet reached New Zealand. If and when they do, they are liable to be most expensive.

Cotton mats which are now on the markets have the advantage that they can be washed. They become shabby very quickly and those with very long pile soil readily.

Backings

Backings may consist of linen, cotton, jute, paper, or rubberised material. The backing should be closely woven and also be firm yet flexible enough to be rolled. Latex backing is usually used on the new tufted carpets; it gives an added cushioning effect, helps to prevent skidding, and is a necessary part of its manufacture.

Moth and Carpet Beetle Proofing

Carpet beetles are rapidly becoming one of the worst household pests in New Zealand. They can be a constant source of worry to housewives, especially with wall-to-wall carpets which are tacked down at the edges. Because they are small, these pests can often go unnoticed until the damage has been done.

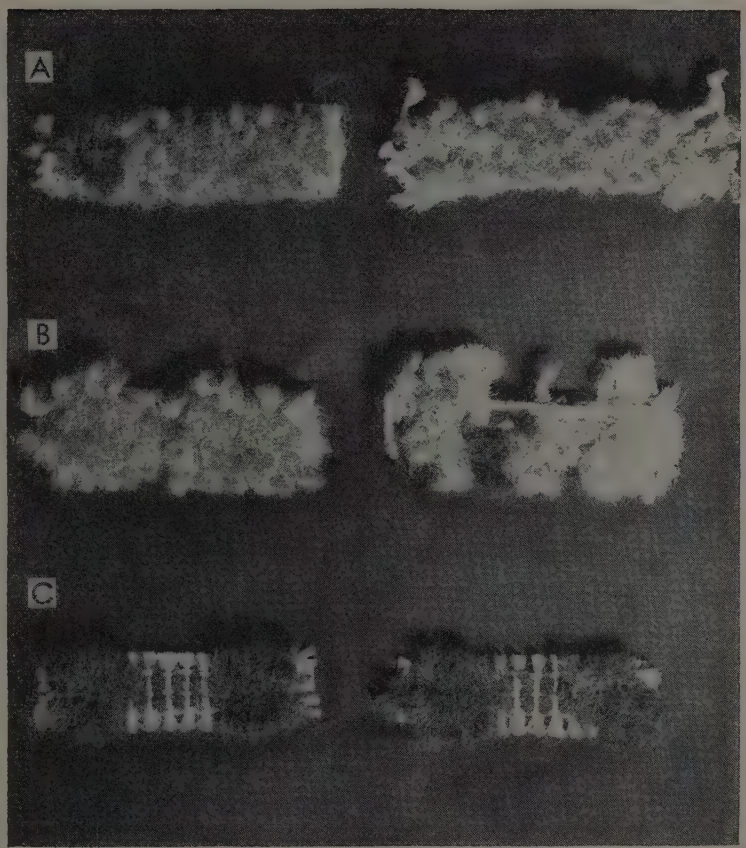
At least one firm is now marketing moth and carpet beetle proofed carpets with a lifetime guarantee. These carpets are no more expensive than the untreated ones and if new carpets are being purchased, it is worth while to inquire whether they have been treated in this way. Unfortunately, existing carpets cannot be treated satisfactorily, because the proofing substance must be impregnated in the yarn before it is woven into carpets.

The substance which protects against wool damage by keratin-digesting insects is a type of colourless dye that is soluble in boiling water. It is put into the dye bath and the unwoven woollen yarn is immersed in it. The treatment is fast to washing and dry cleaning.

Soil-resistant Treatment

Another treatment that has recently been advertised for carpets is the soil-resistant treatment. This is a colloidal silica finish and treated carpets have a slightly harsher feel.

Though this treatment does not entirely prevent carpets from becoming dirty, they will stay cleaner up to three times longer than will untreated ones, provided they are cleaned in the normal manner with a vacuum cleaner or carpet sweeper. Carpets with this finish are slightly dearer.



A New Zealand carpet-manufacturing firm has had tests carried out to show the effectiveness of moth and carpet beetle proofing. Sample A has been treated. Samples B and C are untreated.

Carpet Widths

Until fairly recently all body carpet available has been 27in. wide. Lately, however, the trend seems to be toward broadloom. This is made in widths of up to 15ft., which gives several advantages in a large room. It requires less handling and if the room is to be carpeted wall to wall, there will be few, if any, seams. As seams are one of the greatest potential wearing points of a carpet, this should increase the life of the carpet.

The over-all cost of broadloom is slightly higher than that of 27in. wide carpet, and 27in. widths are much more satisfactory for irregular-shaped rooms.

Carpet selling is a highly competitive business, but because of their high price carpets are to some extent an investment. Prospective purchasers should not be influenced by offers such as free laying and fitting unless it is quite certain that the carpet being bought is the best possible value for the money that is being spent.

Care of New Carpets

There is a widespread belief that carpets should not be cleaned with a vacuum cleaner during the first 3 months they have been laid down. This is a fallacy.

One of the heaviest causes of wear and tear on carpets is the small particles of dirt and grit brought in on people's shoes. These become embedded in the pile of the carpet and are gradually trodden right down and on to the backing. They damage both the fibres and the backing, so obviously the sooner they are removed the better. The vacuum cleaner will do this most satisfactorily.

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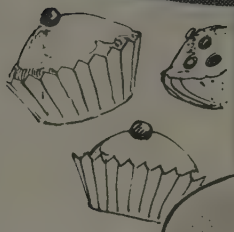

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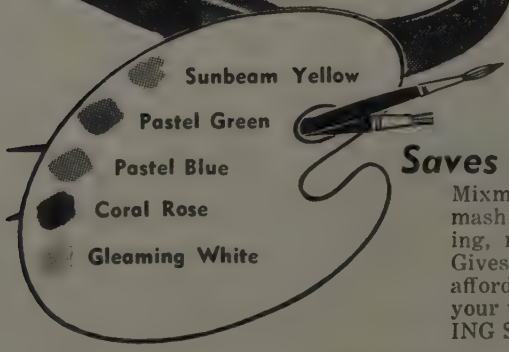

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The use of suitable types of castors on furniture will prevent heavy indentations appearing on a carpet.

Loose tufts (sprouts) of yarn appearing on the carpet surface can be aggravated by the suction of a vacuum cleaner, but are very noticeable and if they appear they should be cut to the length of the pile with a pair of sharp scissors. **Never try to pull them out.**

Piles of fluff coming out of a carpet are caused by the short fibres left in the yarn after the pile is cut. These are working their way out and the fluffing will stop as soon as all of these fibres are removed. This will usually take about 3 months. Using a vacuum cleaner will not increase the amount of shedding and has nothing to do with causing it. As dirt encourages both moths and carpet beetles, it would appear that it is unwise not to use a vacuum cleaner from the very beginning.

Occasional Brushing

An occasional brushing with a semi-stiff brush in the direction of the pile is a good idea. That and a vacuuming at least once per week is the treatment advised for carpets from the time they are laid.

No carpet is guaranteed fadeless, though some are more fadeproof than others, but remember that accumulated dirt from the atmosphere will produce the illusion of fading by dulling the colours.

There is available a very good dry (powder) cleaner for carpets. Though it may be rather tedious to use over the whole of the carpeted area of a house, it is excellent for the removal of greasy or dirty marks which so often just seem to arrive. The powder is put on, left for an hour or so, during which time it changes colour, and then is removed by a carpet sweeper or electric cleaner.

Always try to remove stains immediately they appear. Any stain is considerably harder to clean off if it has been left for some time. Always pat dry any liquids immediately they have been spilt, as certain shades of dyes may tend to bleed.

Turning Carpets Round

It is a great advantage to be able to turn a carpet round periodically to get more even wear. However, this is not always possible, especially if the carpet is fitted. If this is the case, have matching squares or close-matching rugs that can be placed in doorways or areas where the wear is greater. These should be taken up or moved regularly, as otherwise the protected area will soon show up against the rest of the carpet.

Carpeting Stairs

When carpeting stairs allow a little extra length at the top and bottom. This can be tucked away out of sight, but it will allow the carpet to be moved slightly up or down when it begins to show signs of wear.

Do not use a beater or snap throw rugs or carpets when they are being shaken. Either of these can break the backing yarns or cause tufts to fall out.

Do not push heavy furniture across floor coverings, as the fibres can be seriously damaged. Spindle-legged furniture or legs of heavy furniture can leave very noticeable indentations on carpets. To prevent this use suitable castors such as those shown in the illustration above.

Do not use ammonia or other alkalis, such as laundry soaps, on carpets. These can damage fibres and cause colours to run. Soap leaves a film which attracts fresh dirt.

All photographs by Sparrow.

HOUSEHOLD Uses for SILICONES

PREVIOUSLY of interest only in the field of science the family of chemicals known as silicones are, through their remarkable characteristics, gradually finding a wide practical application. During the last 10 years they have been used increasingly in industry and are now gaining recognition on the domestic front, chiefly perhaps as a constituent of car and furniture polishes. However, easier polishing is only a forerunner of benefits to come, and the versatile qualities of the silicones hold great promise for their extended use in the future.

SILICONES are synthetic chemical substances which have the valuable properties of being resistant to extremes of temperature, water and dirt repellant, anti-stick, and good electricity insulators. Though related to glass, they are produced in many different forms which do not resemble it in appearance. They may be fluids, greases, varnishes, resins, or rubber and as such can be used in a number of vastly different ways. For instance when added to polishes in their fluid form they give increased gloss and protective finish, and as insulating rubber and lubricants they are used to enable jet planes to fly with red-hot engines in the sub-zero temperatures of high altitudes.

In one form they act as adhesives and will bond substances together, but as release agents they have the opposite effect and prevent things from sticking together. As water repellants they will keep masonry walls dry, give a showerproof finish to materials, or protect the skin from moisture. Finally some of their compounds are used as defoamers in wine making and other industries to prevent excessive formation of foam.

By ELEANOR COUSTON,
Home Science Extension Officer,
Department of Agriculture, Christchurch

Silicones in Polishes

One of the main reasons for adding silicones to liquid polishes is to give a quick shine without a lot of rubbing. The polish is applied, left to dry, and rubbed off gently, leaving a durable, glossy finish. As this finish is water repellant, spills or drips can be wiped away without leaving a stain. The heat-resistant properties of silicone polish make it particularly useful for window sills and on tables for reducing the risk of heat marks. Though mats are necessary to protect table surfaces from oven-hot dishes, silicone polish will give protection from moderate temperatures.

In wax polishes the silicone acts mainly as a spreading agent, making both the application and the polishing easier. When it is added to good waxes a ready shine can be obtained without the laborious effort which is usually required. The resulting surface will resist water and have the quality of preventing substances from sticking to it.

Because of this repellant quality, silicone-treated furniture cannot be repainted or re-treated until the silicone has been removed thoroughly. However, this can be done by washing it with turpentine and using frequent changes of clean cloth.

Apart from their value in polishes for wooden surfaces, silicones are a useful addition to car or tile polishes, as they increase the gloss, reduce the labour involved, and give a protective finish. Mops and dusters impregnated with silicone polish will do the double job of removing dust and polishing simultaneously.

Silicone-treated Fabrics

Fabrics can now be treated with silicones to make them impervious to water and stain resistant. When watery liquids are spilt on these treated fabrics the moisture "beads up" like drops of mercury and can be shaken off before it sinks in and stains. The only apparent difference between treated and untreated fabrics is that the former have a smoother, softer feel and better draping qualities than many of the untreated ones. Though giving a protective coating, the silicone does not close the pores of the fabric or affect its appearance in any way.

Synthetic fibres were first found to be the most easily treated with silicones, but processes have now been developed which give a water-repellant finish to wool, cotton, and even to such absorbent materials as suede. Successful treatment of rainwear has been followed by similar treatment of fabrics such as velvet and a well-known synthetic. In future it may be possible to buy furnishing fabrics and carpets which will shed tea, coffee, and liquor and therefore not be stained by them.

Water-proofing Masonry

Without affecting their appearance in any way masonry and brickwork can be given a water-repellant finish by treatment with silicone resins. Though the silicones penetrate to a considerable depth, they do not close the pores of the stonework, so any dampness within the wall may still dry out. This protective coating prevents deterioration from the effects of moisture, but no claim is made that the treatment will cure dampness which is the result of structural faults.

Non-stick Cooking Utensils

Future benefits for the housewife to expect include silicone-treated cooking utensils. The slippery quality of some of the silicones is useful for treating baking tins to prevent non-sugary foods from sticking to them.

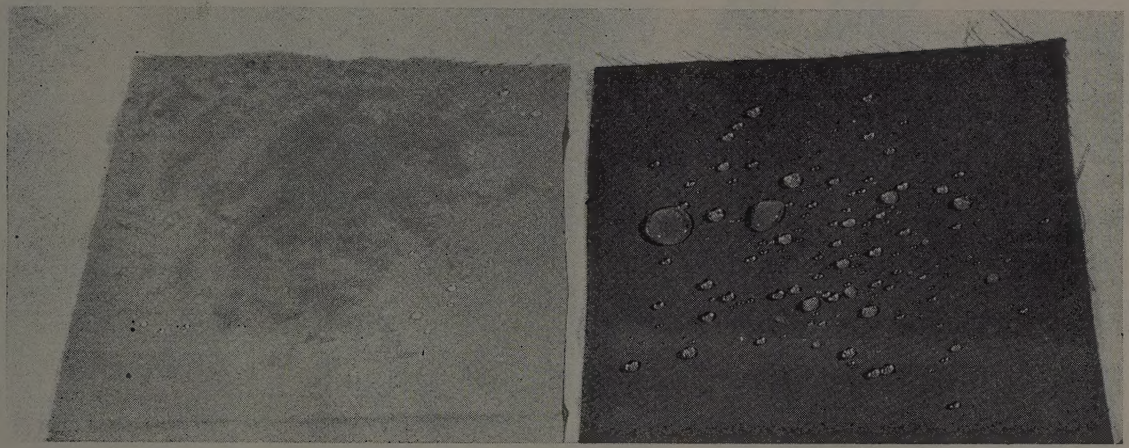
This characteristic is particularly useful for bakeries, because not only will the bread leave treated tins without sticking, but the tins can be used many times without being washed. Bread cooked in silicone-treated tins is more evenly baked and coloured than is that cooked in tins which have been greased in the usual way.

Food can be cooked in silicone-treated frying pans without the addition of fat, and can be removed easily, as it does not stick.

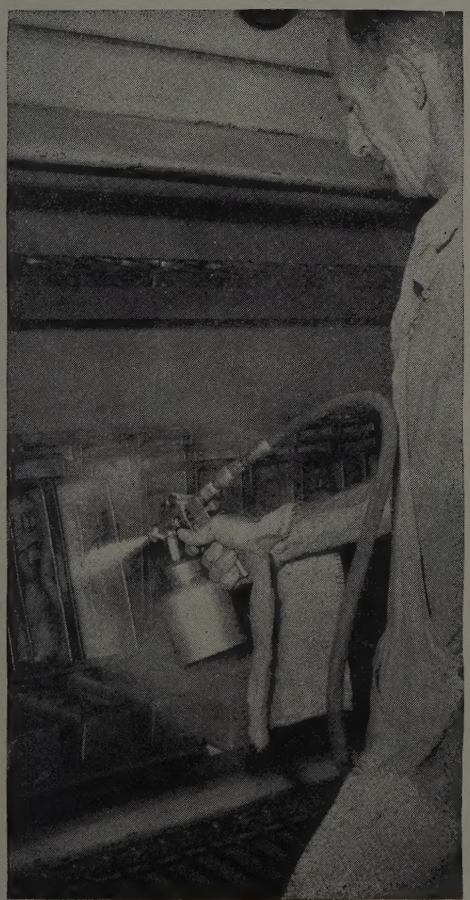
This non-stick quality is also used in preparing syringes and needles to prevent the blocking of these instruments in blood transfusions, and for the treatment of glass vessels to make the dispensing of medicines more accurate.

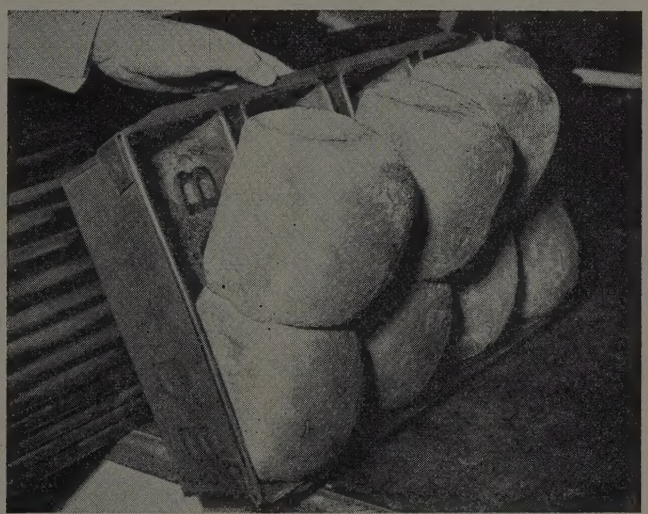
Protective Cosmetics

Silicones are also a constituent of some of the barrier creams which are used for protecting the hands during rough, wet work and dirty work. They form a water and soil-resistant protection for the skin and are effective in the prevention of certain occupational



Watery liquids form beads on a silicone-treated fabric (right) and can be shaken off without being absorbed or leaving a stain as on an untreated fabric (left).





Baking tins can be treated with silicone resin (left) to prevent loaves from sticking. Loaves fall out easily from silicone-treated tins (above).

skin complaints. As they will not come off in water, they are likely to become an important constituent of sunburn creams.

Silicone Rubber

One of the few solid silicones produced is silicone rubber. This is not natural or synthetic rubber treated with silicone, but actually silicone in one of its many forms. Its great advantages over other forms of rubber is that it is stable in extremes of temperature and will remain flexible under conditions where natural or synthetic rubber will decompose. It is not affected by moisture or air, so will doubtless find a place in the home for gaskets on oven doors and refrigerators and in other ways.

Good insulation of electricity is another property of silicone rubber. It is particularly suitable for equipment operating at high temperatures or under humid or wet conditions.

Silicone Greases and Oils

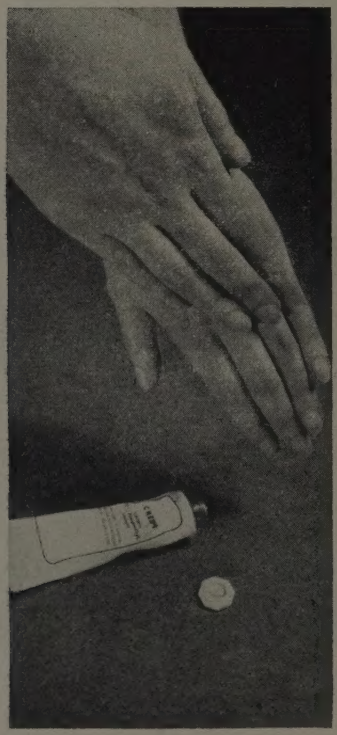
Silicone greases and oils are being used in aviation and other industries, because they will stay at the correct

SILICONES . . .

consistency in either intense heat or intense cold. Domestic use could include application to kitchen ware and garden tools to protect them from effects of moisture, and for lubricating the enclosed mechanisms of electric clocks, automatic toasters, and oven timers.

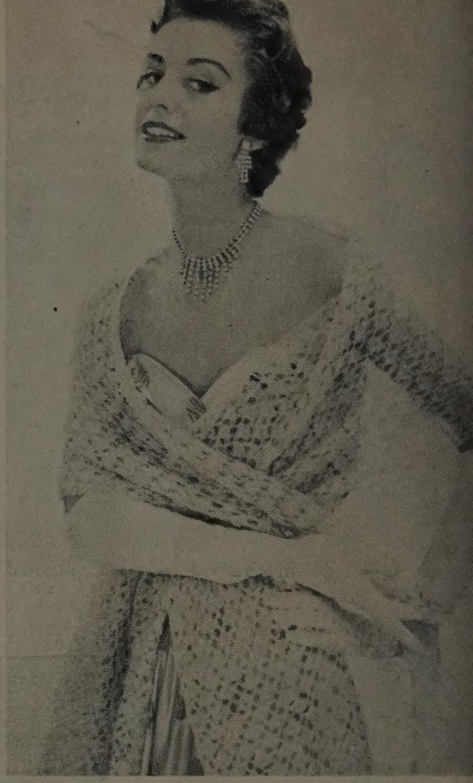
Here to Stay

Silicone preparations, because of their unique combination of properties, would seem to have almost unlimited possibilities. They are bound to come gradually into everyday use and, whether recognised or not, will make machinery run more smoothly, protect furniture and clothing, and generally reduce numerous household problems. A label may not always show what an article is made from, but housewives will undoubtedly soon be asking "Does it contain silicone?" or "Is it silicone treated?" when a durable polish or a water- and dirt-repellant fabric is required.



Silicone creams protect the skin from moisture.

A Dainty Lace Stole for Evening Wear



A CHARMING and dainty stole to give the smartest of ensembles a filmy touch of elegance is illustrated at right. It can be made to any desired length to suit the wearer. Directions for making the stole are given below.

ABBREVIATIONS: Ch., chain; sl. st., slip stitch; tr., treble; l. tr., long treble; rep., repeat; shell, 1 tr. 3 l. tr. 1 tr. all into same stitch; patt., pattern.

Materials: 8 balls of 2-ply wool (with tinsel thread running through it); crochet hook wool-size 5.

Measurements: Length 2½yds., width 20in.

Tension: 1 patt. measures approx. 1¼in.

The Stole

Make 228 ch.

1st row: 3 l. tr., 1 tr. into 4th ch. from hook, * miss 3 ch., sl. st. into next ch., 6 ch., miss 5 ch., sl. st. into next ch., miss 3 ch., shell into next ch. Rep. from * to end, turning with 6 ch.

2nd row: * Sl. st. into centre l. tr. of shell, 6 ch., sl. st. into 6 ch. loop, 6 ch. Rep. from * ending with 1 sl. st. into centre of last shell, 3 ch., 1 tr. into base of shell, turn with 6 ch.

3rd row: Sl. st. into first loop, * 6 ch., sl. st. into next loop, shell into next sl. st., sl. st. into next loop. Rep. from * ending row with 6 ch., sl. st. into turning ch. Turn with 6 ch.

4th row: * Sl. st. into 6 ch. loop, 6 ch., sl. st. into centre of shell, 6 ch. Rep. from * ending row with sl. st. into loop, 3 ch., 1 tr. on turning ch. Turn with 3 ch.

5th row: 3 l. tr., 1 tr. into loop, * sl. st. into next loop, 6 ch., sl. st. into next loop, shell into next sl. st. Rep. from * ending with shell into end loop instead of into sl. st. Turn with 6 ch.

Rep. rows 2 to 5 inclusive until work measures 2½yds. (or length required). Fasten off.

The Fringe

Join on yarn at one corner and work thus:—

* 24 ch., sl. st. back into 16th ch. (thus working an 8 ch. loop), 16 ch., sl. st. into edge. Rep. from * along one end, leaving about ¼in. spaces between the sl. st.

Press work lightly.

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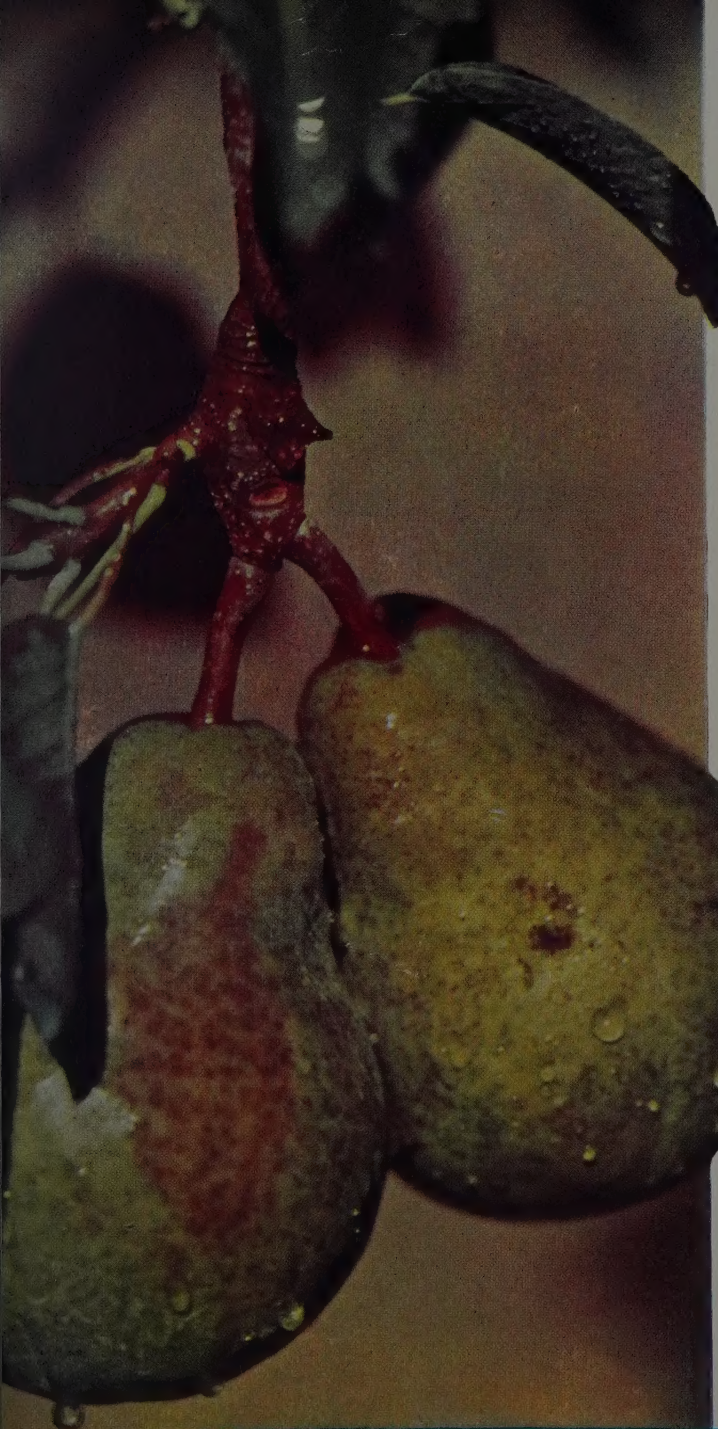

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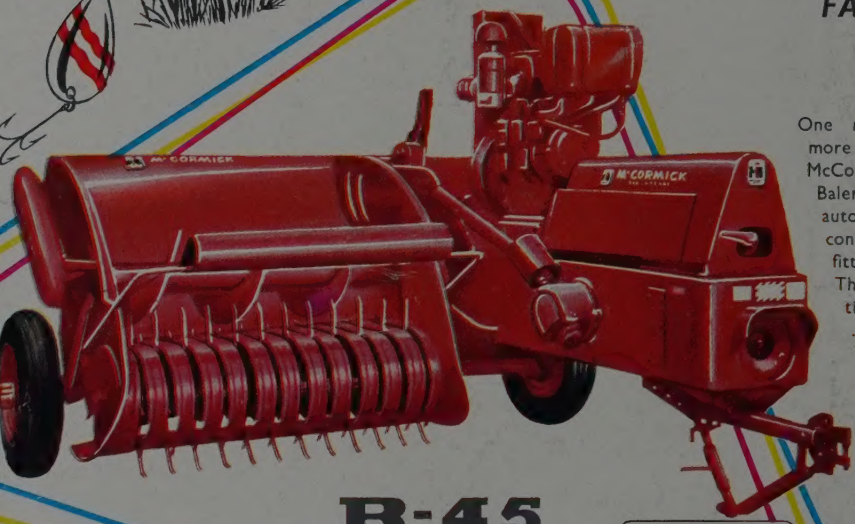

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